# ANCIENT IRANIAN METALWORK

## IN THE ARTHUR M. SACKLER GALLERY AND THE FREER GALLERY OF ART

*Ann C. Gunter and Paul Jett*

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ARTHUR M. SACKLER GALLERY • FREER GALLERY OF ART
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FREER GALLERY OF ART

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# Contents

6 Foreword
*Milo C. Beach*

8 Preface

10 Acknowledgments

13 The Collections and Their Classification
*Ann C. Gunter*

23 Shapes and Decoration
*Ann C. Gunter*

32 Colorplates

49 Materials and Methods of Manufacture
*Paul Jett*

61 Catalogue
*Ann C. Gunter and Paul Jett*

63 *Achaemenid Period: Entries 1–4*

79 *Seleucid and Parthian Periods: Entries 5–12*

105 *Sasanian Period: Entries 13–42*

223 *Suspected Forgeries: Entries 43–47*

241 Appendix: Analytical Techniques

251 Concordance

252 Glossary

255 References

269 Index

# Foreword

OVER A PERIOD of some seventy years, following its opening in 1923, the Freer Gallery of Art has acquired a small collection of ancient Iranian metalwork distinguished for its quality and interest. In 1982 the Arthur M. Sackler Gallery was established with a gift of nearly one thousand works of Asian art that also included significant holdings of ancient Iranian metalwork. Between 1986 and 1990, these two collections were studied by Ann C. Gunter and Paul Jett, both members of the museums' research staff, in consultation with specialists in other institutions. The result is the present catalogue, a detailed description and analysis of the ancient Iranian metalwork of Achaemenid through Sasanian date housed in the two museums. Dr. Gunter, associate curator of ancient Near Eastern art, wrote the essays on the collections and the vessel shapes and decoration as well as the descriptions and art-historical discussions of each object in the catalogue. Mr. Jett, supervisory conservator, contributed the essay on materials and methods of manufacture, the technical discussions of each object, the appendix on analytical techniques, and the glossary.

The problems of dating, attribution, and authenticity attending the study of ancient Iranian metalwork are well known and require little elaboration. The collaborative approach exemplified in this catalogue, combining connoisseurship and technical examination, has proven to be an effective research strategy when applied to ancient Iranian metalwork as well as to other media and cultural spheres. With respect to the Freer Gallery's own collections, earlier studies of Chinese bronzes and Islamic metalwork established a precedent of multidisciplinary investigation and publication, which the present catalogue follows.

A new direction for both museums lies in the joint study and publication of their collections. The unique circumstances of the museums' proximity and combined staff furnish an opportunity to examine and compare two closely related and highly complementary collections that—although in adjoining museums—cannot be exhibited together. The advantages of analyzing such collections through the vehicle of a joint publication are many. By enlarging the scope of the study, the possibilities of gaining new insights through comparison and a wider frame of reference are considerably enhanced. This form of publication should also enable readers and visitors to appreciate more fully the historical, aesthetic, and technical relationships that unite the ancient Iranian objects in the two collections.

This catalogue is the first in a series of scholarly publications devoted to the permanent collections of the Freer and Sackler galleries that is funded by a publications endowment initially established by a generous grant from the Andrew W. Mellon Foundation. Additional gifts to the endowment were made by an anonymous donor, the estate of Leon Pomerance, William Douglas McAdams, Inc., and Elizabeth Ann and Willard G. Clark.

Milo C. Beach
*Director*
Arthur M. Sackler Gallery
and Freer Gallery of Art

# *Preface*

AMONG THE MOST DISTINCTIVE and significant achievements of ancient Iranian art and technology are the objects made of gold, silver, and bronze, ranging from vessels and weapons to jewelry, clothing appliqués, and other personal ornaments. This volume describes and analyzes the Iranian metalwork of Achaemenid through Sasanian date housed in the permanent collections of the Arthur M. Sackler Gallery and the Freer Gallery of Art, Smithsonian Institution.

Although most of the ancient Iranian metal artifacts in the two museums have been made available for study through exhibitions, few have been the subject of specialized art-historical or technical investigations. Moreover, these particular collections have not previously been examined together. When considered as a unit, they are of sufficient quantity and variety to sustain broader observations and conclusions concerning ancient Iranian metalwork.

Most of the objects were produced in the Iranian empires that ruled large parts of West and Central Asia from the mid-sixth century B.C. to the mid-seventh century A.D. The Arab conquests of the seventh century A.D., which brought the Sasanian Empire to an end, mark the conventional division between ancient and medieval in the Near East and Central Asia. In the title of this catalogue the term "Iranian" is used in a broad sense. It designates objects made within the geographical region that corresponds roughly to the modern nation of Iran; and it also encompasses products of neighboring regions that had come under Iranian rule or influence. Much of the metalwork created during these periods resulted from shared cultural traditions, in which Iranian elements were often combined with those of adjacent areas to form new styles. The catalogue also includes several objects described as Iranian in previous publications or exhibition texts that can now, on the basis of more recent research, be assigned a probable place of origin elsewhere in the eastern Mediterranean, the Near East, or Central Asia. With few exceptions, the group of objects treated here forms a meaningful unit from typological, historical, cultural, and technical points of view.

The catalogue represents a collaborative endeavor. While essays and catalogue entries were written individually, the authors worked in close consultation throughout all stages of research and writing. In addition to the forty-seven objects included in this study, more than one hundred objects in other collections were examined for purposes of comparison and wider reference.

The catalogue is intended to provide a detailed reference work on two of the collections in the national museums. A comprehensive study of Sasanian silver vessels completed by Prudence O. Harper and Pieter Meyers will furnish a detailed catalogue and discussion of Sasanian silver vessels in collections in the United States, Great Britain, Europe, Iran, Russia, and Georgia. The first volume, treating vessels with royal imagery, was published in 1981; the second volume, devoted to nonroyal vessels, is now in preparation. These publications examine the silver vessels of Sasanian date in the Freer and the Sackler Gallery collections and should be consulted for additional comparisons and information on the wider context of the material.

# Acknowledgments

IT IS A PLEASURE to express our gratitude to individuals and institutions for assistance and support during the research and writing of this volume. Our deepest debts are to Prudence O. Harper, curator and head of the Ancient Near East Department, the Metropolitan Museum of Art, and Pieter Meyers, head of Conservation, Los Angeles County Museum of Art. Their research on Sasanian silver vessels, especially those in the Arthur M. Sackler Gallery, provided the indispensable foundation for our research project. Dr. Harper made available unpublished essays on most of the Parthian and Sasanian silver vessels in the Sackler Gallery and permitted us to examine ancient Iranian metalwork in the collections of the Metropolitan Museum of Art. Dr. Meyers gave us access to his unpublished studies of Sasanian silver vessels in a number of collections. Both of them spent time with us examining and discussing objects in the collection, provided countless references, and stimulated our thinking in a variety of ways. We are grateful for the extraordinary generosity with which they shared their unrivaled knowledge of the material, and for their interest and support.

Colleagues in many institutions extended every courtesy and assistance in our study of material in their collections. W. Thomas Chase, head of the Department of Conservation and Scientific Research of the Freer and the Sackler galleries, accompanied us on travels to collections overseas and offered helpful observations and comments on the manuscript. We owe special thanks to Karel Otavsky, Abegg-Stiftung, Bern; Roger Moorey and Michael Vickers, Department of Antiquities, Ashmolean Museum; Katsumi Tanabe, Ancient Orient Museum, Tokyo; Irène Aghion and Michel Amandry, Cabinet des Médailles, Bibliothèque Nationale; John E. Curtis, Department of Western Asiatic Antiquities, and Jessica Rawson, Department of Oriental Antiquities, the British Museum; Arielle Kozloff, Department of Ancient Art, Cleveland Museum of Art; Marion True, Department of Antiquities, the J. Paul Getty Museum; Nancy Thomas, Department of Ancient and Islamic Art, Los Angeles County Museum of Art; Yvette Mottier and Claude Ritschard, Musée d'Art et d'Histoire, Geneva; Annie Caubet and Françoise Tallon, Department of Oriental Antiquities, Musée du Louvre; and Hiromu Abe, Shōsōin Repository, Nara. Elizabetta Valtz of the Museo Egizio, Turin, facilitated our research at the Museo Civico, Turin.

Boris Marshak, Hermitage Museum, Saint Petersburg, kindly permitted us to study the Sasanian and Central Asian silver in the Hermitage collections, and discussed with us the Freer and the Sackler Gallery collections during his trips to Washington in December 1989 and March 1991. Philippe Gignoux, École Pratique des Hautes Études, Paris, read and translated the Pahlavi inscriptions on four objects in the collections. We are also grateful to Thomas Lawton, Freer Gallery of Art and Arthur M. Sackler Gallery, and to Margaret Cool Root, Kelsey Museum of Archaeology and Department of the History of Art, University of Michigan, for reading our manuscript and contributing many helpful suggestions.

Other colleagues helped with the technical study of the metalwork. Lisha Glinsman, National Gallery of Art, made a significant contribution through her X-ray fluorescence analyses of the objects. Further analytical work was carried out by Deborah Rendahl, National Gallery of Art, and John Winter, Freer Gallery of Art and Arthur M. Sackler Gallery. Joseph Nelen, National Museum of Natural History, contributed to the electron microprobe study of samples; Melanie Feather and Mary Ballard, Conservation Analytical Laboratory, Smithsonian Institution, also offered assistance and comments.

A Scholarly Studies Grant from the Office of Fellowships and Grants, Smithsonian Institution, financed the travel of the authors and of Mr. Chase to collections in New York, Los Angeles, Cleveland, London, Paris, Tokyo, Saint Petersburg, and Moscow. The grant also provided funds for Afsaneh Ardalan Firouz to serve as research assistant during 1989 and 1990; she provided invaluable assistance in the assembling of references and photographs. The authors' travel to museums in Bern, Geneva, and Turin was made possible by travel grants from the Smithsonian Institution's Research Opportunities Fund.

Thanks are due to our editor, Kathleen Preciado, for eliminating many infelicities of style and improving the clarity of presentation; and to Mary Cleary, editorial assistant, for her meticulous attention and useful suggestions during final preparation of the manuscript. The attractive and thoughtful design of the book is the work of Beth Schlenoff.

Ann C. Gunter
*Associate Curator of Ancient Near Eastern Art*
and
Paul Jett
*Supervisory Conservator*

# The Collections and Their Classification

WHILE A PRINCIPAL AIM of this volume is to consider in association the ancient Iranian metalwork in the Freer and the Sackler galleries, the distinctive aspects of each collection should not thereby be disregarded or obscured. Assembled by different individuals under separate institutional circumstances, which changed over time, the collections of the two museums reflect the growth of knowledge of early Iranian metalwork as represented in both public and private collections in the United States. A brief description and history of each collection is presented by way of introduction, drawing primarily on documentation preserved in the museum archives and registrarial records.

## Freer Gallery of Art

Sixteen objects in the Freer Gallery of Art, all but one made of silver or gold, have been assigned to the Achaemenid through Sasanian eras. One is an Achaemenid phiale [3], and two are objects probably of Seleucid or Parthian date [8, 12]. Most are well-known types of Sasanian silver plate, including three vases [32–34], two royal hunting plates [13, 14], a plate with Dionysiac imagery [16], an elliptical bowl [28], and a bowl with an interior medallion bust [24]. A silver bowl or boss decorated with figures in relief was probably made in Bactria during the Sasanian period [23]. The objects of Sasanian date span most of the empire's duration, ranging from the late third century [24] and fourth century [13], the fifth and sixth centuries [perhaps 14, 16, and 23], through the sixth and seventh centuries [28, 32–34].

The Freer collection of ancient Iranian metalwork was assembled over a period of nearly eighty years. Since each acquisition was documented individually, the growth of the collection can be followed in some detail. The earliest acquisition treated in this catalogue, a bronze vessel handle [8], was purchased by Charles Lang Freer (1854–1919) during a visit to Cairo in 1909. Freer's antiquarian interests in the eastern Mediterranean and Near Eastern world were primarily devoted to Egypt, and the bronze handle was presumably a chance acquisition from a dealer, Maurice Nahman, from whom Freer had purchased objects during previous trips to Cairo.[1] At the end of the nineteenth

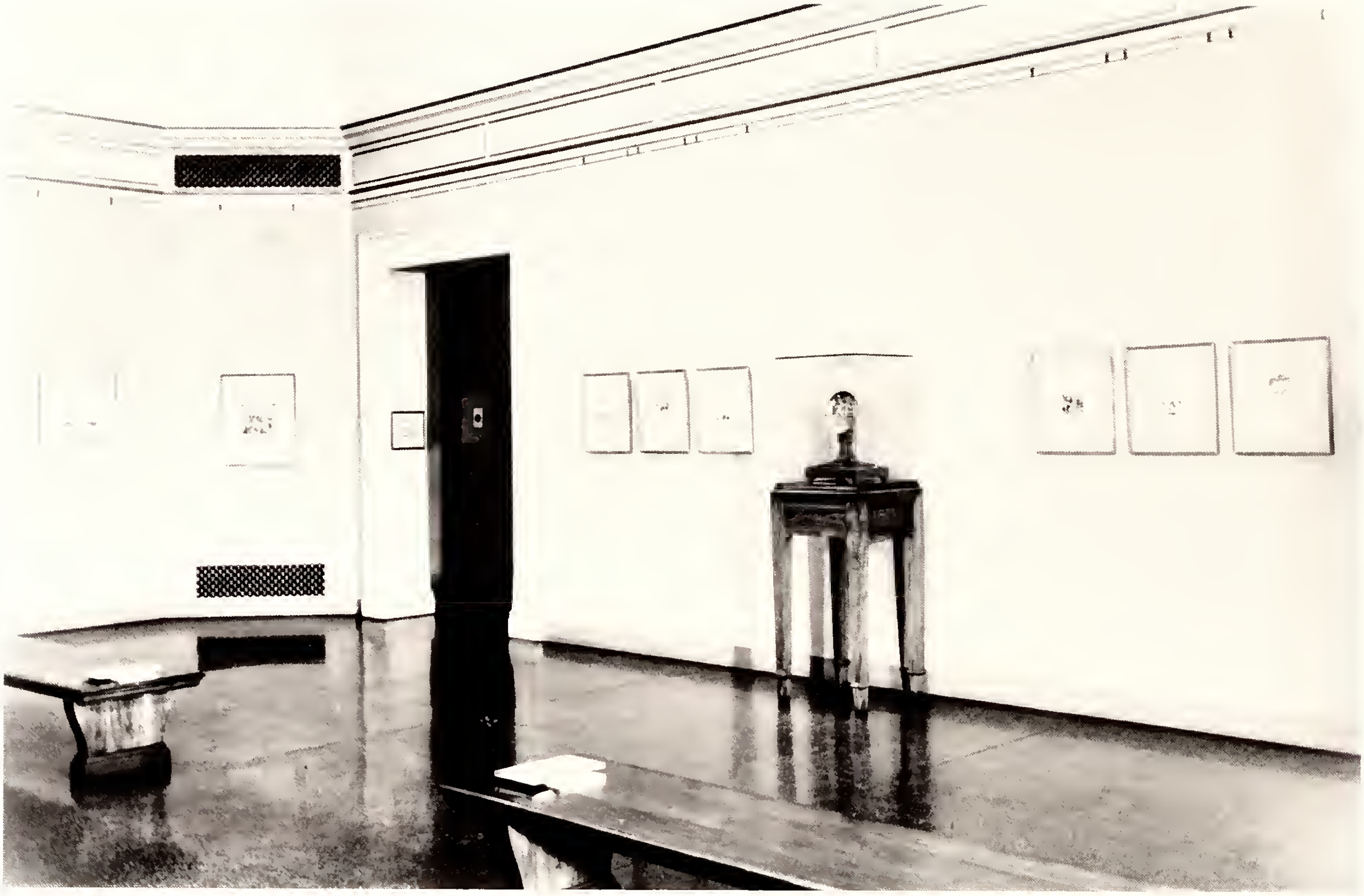


Fig. 1. Sasanian silver-gilt hunting plate [13]. Freer Gallery of Art, 1943.

and beginning of the twentieth century, when Freer assembled his collection of Asian and American art, Iranian metalwork of pre-Sasanian date was virtually unknown in the United States or Europe.

During the 1920s Sasanian silver vessels from Russia and Iran entered the antiquities markets in Europe and the United States.[2] In 1934 the Freer Gallery purchased the "Stroganov plate" [13], a royal hunting plate probably depicting the Sasanian king Shapur II (r. 309–79). Formerly in the collection of Count Stroganov in Saint Petersburg, the vessel had been found in 1872 in the Perm region of northern Russia and therefore belongs to the group of silver vessels represented primarily by the collection in the Hermitage Museum in Saint Petersburg and traditionally grouped as "Sasanian." The Stroganov plate was one of the first of these silver finds from Russia to reach North American collections.[3] An exhibition of Iranian art assembled in New York in 1940 by the Iranian Institute of America presented what was then known of pre-Islamic metalwork from the Near East; one object [23] was acquired a few years later by the Freer Gallery of Art.[4]

Most of the ancient Iranian metal objects in the Freer collection were purchased between 1947 and 1967 under the supervision of Richard Ettinghausen

(1906–1979), then curator of Near Eastern art. They belong to the group of artifacts with alleged Iranian provenance that became increasingly available for purchase on the antiquities market and were acquired by a number of European and American museums and private collectors, most actively during the 1960s.[5] In 1971 those acquisitions were displayed in a special exhibition of Iranian art at the Freer Gallery.[6] In 1974 the museum acquired a silver phiale dating to the Achaemenid period [3]. The most recent addition to the collection was made in 1985 [28].

The authenticity of four objects in the Freer collection previously exhibited and published as works of ancient Iranian art has been questioned on both stylistic and technical grounds [43, 45–47]. These works are published here as suspected forgeries.

Since the terms of the Freer bequest do not permit the collections to be exhibited outside the museum, ancient Iranian metalwork in the gallery played no role in the exhibitions of the 1960s and 1970s that helped generate new critical approaches to the study of Sasanian silver. The exceptions were, of course, those objects exhibited or published before their acquisition by the Freer. The museum's most recent acquisition, a Sasanian silver bowl [28], had been previously shown at an exhibition organized by Oleg Grabar at the University of Michigan in 1967, a landmark event in the history of Sasanian silver studies.[7]

The Freer Gallery research staff has played a significant role in the development of technical studies of Sasanian silver—studies that have assumed critical importance in current scholarly investigations. During the 1950s the museum's technical laboratory carried out pioneering investigations of Sasanian silver vessels in the collection of the Walters Art Gallery, Baltimore.[8] Two silver plates from the Freer's own collections [13, 16] were the focus of a detailed technical study published in 1968.[9] Those Sasanian silver objects that formed part of the Freer collection by the early 1970s are included in the comprehensive study of Sasanian silver vessels from numerous collections undertaken by Prudence O. Harper and Pieter Meyers. This work has introduced new methods of technical analysis together with new typological and stylistic criteria for dating, attribution, and interpretation.[10]

## Arthur M. Sackler Gallery

Thirty-one objects from the collection of Arthur M. Sackler (1913–1987) presented to the Smithsonian Institution have been assigned to the Achaemenid through Sasanian periods.[11] Two are bronze phialae of Achaemenid date [1, 2]; a bronze jug is probably of late Achaemenid or early Ptolemaic date [4]. Six silver vessels are products of the Parthian era: three bowls [5–7] and three horn rhyta [9–11]. A gold zoomorphic cup has been published as a work of

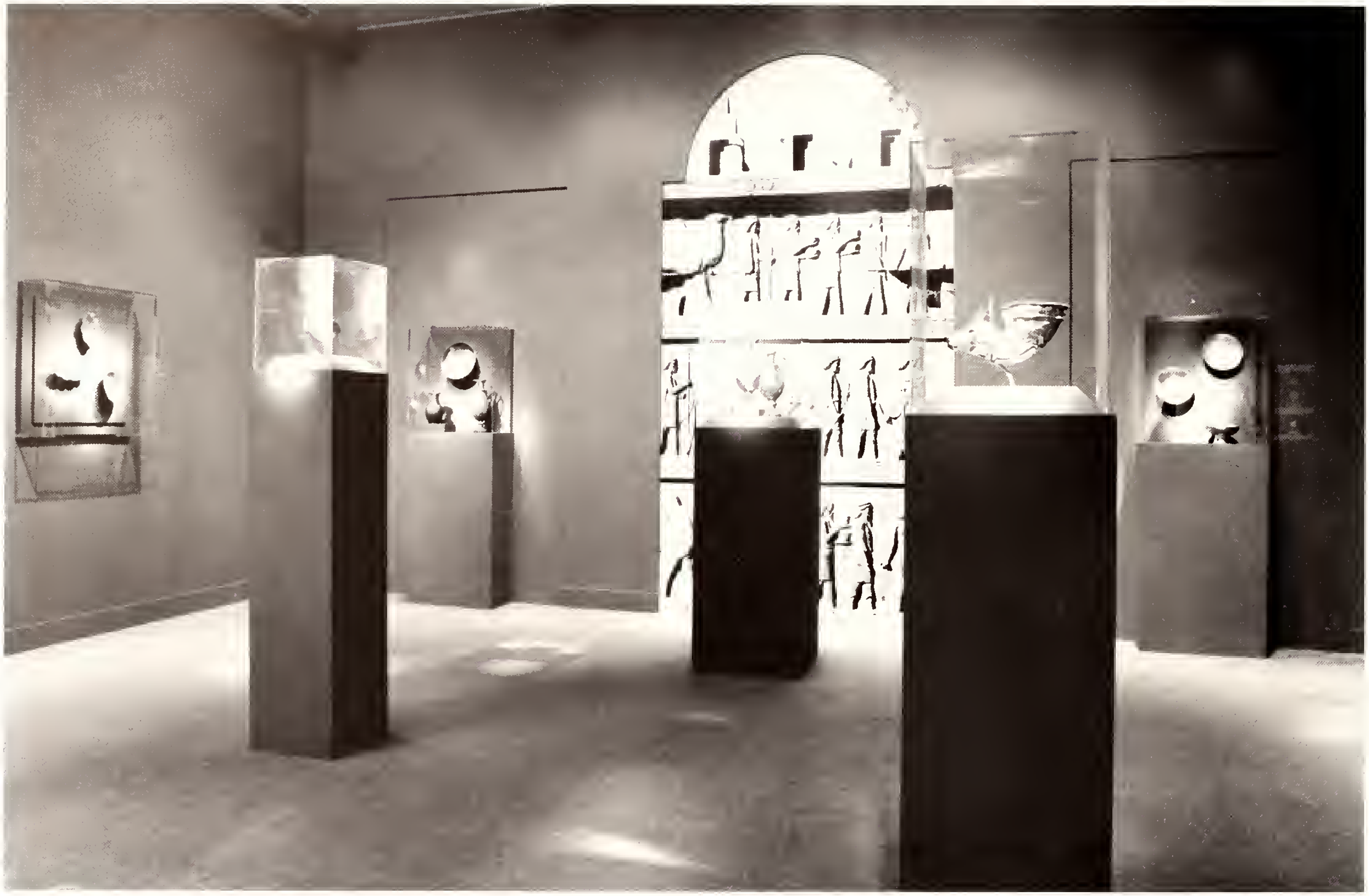


Fig. 2. Sasanian silver-gilt vessels. Inaugural exhibition, Arthur M. Sackler Gallery, 1987.

Achaemenid date [44]. Technical and stylistic studies suggest that it may be a modern forgery.

The remaining twenty-one objects date to the Sasanian period, most of them well-known types of Sasanian silver-gilt vessels. Plates include one with a royal hunting scene [15] and five with other interior ornament [17–21]. Silver bowls number one with a tall foot [26], a small hemispherical example [25], two elliptical bowls [27, 29], and two lobed elliptical vessels [30, 31]. Three ewers are also part of the Sasanian repertory of silver plate [35–37]. Unusual items, all made of silver, are a horn rhyton with a gazelle protome [38]; roundel, perhaps a lid [39]; large disk [40]; and silver-gilt buckle that forms part of a set of belt ornaments [42]. Objects made of other metals are a copper alloy plate [22], gold sword handle and chapes [41], and a set of gold lappet fittings [42]. Most silver plate in the Sackler Gallery belongs to categories produced toward the end of the Sasanian period, in the sixth and seventh centuries, but one vessel [38] can be dated to the early Sasanian period, in the fourth century. The collection is particularly rich in examples of nonroyal silver plate.

The material came to the museum as part of the inaugural gift of nearly one thousand works of art assembled by Arthur M. Sackler; no records describing the growth of the collection are available. Several objects were included in the 1978 exhibition of Sasanian art organized by Prudence O. Harper for the Asia Society Gallery in New York [25, 26, 38, 39]. The collections also formed an important component of the comprehensive study of Sasanian silver vessels carried out by Prudence O. Harper and Pieter Meyers under the auspices of the Metropolitan Museum of Art. Subsequent technical studies of the material have been completed at the Sackler Gallery by Paul Jett and are published in this catalogue.

## Approaches to the Study of Ancient Iranian Metalwork

In recent decades, excavations in Iran and renewed investigations of existing collections of metal artifacts have improved considerably our knowledge of Iranian metalwork of the second and early first millennium B.C.[12] This material is essential to understanding the artistic and technical traditions that prevailed in the region before the Achaemenid Empire was established around 550 B.C. In western Iran, where the most extensive fieldwork has taken place, metal artifacts, including vessels made of gold and silver, have been recovered during controlled excavations of tombs and settlements. Information from archaeological contexts has permitted scholars to document regional styles in shape, decoration, and technique of manufacture.[13]

For the periods examined in this volume, from about 550 B.C. to A.D. 650, very little metalwork from controlled excavations is available for study or comparison. The situation is particularly acute in Iran itself, where most metal artifacts have been excavated illicitly and sold on the antiquities market. Like many other holdings of ancient Iranian metalwork, the Freer and the Sackler Gallery collections consist almost exclusively of examples lacking archaeological context and reliable information on place of origin. Approaches to the material, classification for purposes of research and exhibition, and methods of analysis are therefore of critical importance, as they must substitute in large part for the information on authenticity, date and place of origin, and circumstances of use frequently provided by an excavated context.

This dearth of properly excavated or published material severely limits current understanding of the scope, chronology, or distribution of metalwork in the Achaemenid Empire (ca. 550–331 B.C.).[14] Ancient literary sources record astonishing quantities of precious metalwork housed in the imperial treasury or circulated throughout the empire; clearly, only a tiny fraction has survived.[15] Few examples recovered from scientific excavations have been published in detail or examined from a technical point of view.[16] Objects without known provenance acquired through purchase by museums and private collectors since the 1930s still constitute the vast majority of available evidence; this material requires a systematic review.[17]

What is known of Achaemenid precious metalwork strongly suggests the existence of a shared aesthetic, at least at the highest levels of society, that makes it impossible to speak in isolation of "Iranian" traditions. Distinctive Achaemenid vessel forms, such as the horn rhyton, were made over a wide area of the empire by artisans of diverse ethnicity. Often cited in this connection are the painted reliefs decorating the tomb of Petosiris, an Egyptian official of the late fourth century B.C. These depict a workshop of Egyptian metalsmiths fashioning Achaemenid-style horn rhyta.[18] This apparent homogeneity of much Achaemenid metalwork, coupled with an absence of reliable information on provenance, makes it difficult to recognize regional styles or patterns of production. In a recent study of Achaemenid silver vessels with gilt figural ornament, P. R. S. Moorey has noted that available information suggests at least one center of production in Asia Minor. But the silver-gilt technique of decoration itself has Near Eastern, and specifically Iranian, antecedents.[19] This example suggests again that a blending of artistic traditions drawn from diverse regions had taken place and become established throughout the empire.

Similar problems of evidence and classification burden the study of metal objects produced in the empires established following Alexander's conquests in Asia and Egypt. The importance of metalwork in those cultures is again documented by ancient literary accounts describing enormous quantities of gold and silver vessels.[20] Yet little Iranian metalwork of the Seleucid (312–129 B.C.) and Parthian (129 B.C.–A.D. 224) periods has survived, and most available material has been recovered without benefit of archaeological context. Few sites have been excavated or adequately published, and the nature or extent of court influence on local artistic traditions has not been established. Moreover, investigations of Seleucid and Parthian art have often concentrated on discerning the degree of Greek or Roman influence, resulting in an unbalanced presentation of finds in their historical or cultural context.[21]

Studies of Hellenistic metalwork and of objects produced in Alexandria at the end of the fourth and early third century B.C. provide some information on prevailing fashions in shape and decoration and on the organization of production in the eastern Mediterranean region.[22] Since many types of vessels and ornament were manufactured and circulated over a wide geographical range and since few centers of production have been identified, objects lacking an archaeological provenance can seldom be attributed to specific regions. Some metal artifacts of the Parthian era can be associated with particular geographical regions, such as Iran or Syria, by comparison with works of art in other media recovered during controlled excavations. Many silver objects of this period acquired since 1960 through the antiquities market—including examples in the Sackler Gallery—were reportedly found in Iran, but no certain information on their provenance is available.

Metalwork of the Sasanian period (A.D. 224–651), primarily silver plate, is the best-preserved and most extensively investigated category treated in this catalogue. Several key collections of silver vessels, consisting primarily of accidental finds made in northern Russia or India, were assembled during the nineteenth and early twentieth century in Saint Petersburg, London, and Paris.[23] A large number of objects attributed to the Sasanian period, most with an alleged Iranian provenance, have entered museums and private collections during the twentieth century. Only a few examples of Sasanian metalwork, made of silver or copper alloy, have come from scientific excavations in Mesopotamia or Iran. Recent excavations in China have yielded metalwork of local or of Central Asian manufacture, some with ties to Sasanian traditions. Most of this material has been recovered scientifically, often in closely datable contexts, and has introduced significant new evidence for relative or absolute chronology as well as for reconstructing patterns of production and consumption.[24]

Major advances in the classification and chronology of Sasanian silver objects have been achieved in recent decades through detailed investigations employing both connoisseurship and technical analysis, in combination with new finds from excavations in Iran, Mesopotamia, Central Asia, and China. As the material culture of the Sasanian Empire and its frontiers has become better known, scholars have succeeded in isolating types of vessels as well as subjects and styles of decoration and associating them with particular cultures, regions, and periods. This research has entailed a fundamental reassessment of the large quantity of silver objects traditionally called "Sasanian." Much of this material has been redefined as Central Asian (Sogdian, Hephthalite, Khoresmian) or early Islamic, corresponding to cultures that bordered the Sasanian realm or that flourished following the collapse of the empire. Scholars have also demonstrated the profound influence of Roman and early Byzantine metalwork in the development of Sasanian silver vessel shapes and techniques of decoration.[25]

Prudence Harper has introduced the term "central Sasanian" to designate those works of art produced during the period of Sasanian rule at the order of or under the direction of ruling members of the dynasty. She and Pieter Meyers have identified as "central Sasanian" a group of silver vessels bearing royal images that can be distinguished from products of nonroyal workshops on the basis of shape, subject and style of decoration, technique of manufacture, and metal composition.[26] The term "post-Sasanian" describes works of art dependent on central Sasanian traditions that were created after the fall of the dynasty in A.D. 651.[27]

The present study has been designed primarily on the pioneering model developed by Harper, in collaboration with Meyers, for the investigation of Sasanian silver vessels. While the scope of this study is confined to the Freer and the Sackler Gallery collections, the objects are placed in a broader artistic and cultural context by reference to published works in other collections. Claims of provenance supplied by dealers or previous owners are reassessed in the light of evidence recovered from controlled excavations; a place of origin is proposed if warranted. Technical study of the objects is given special emphasis, not only as a means of determining authenticity but also as a vehicle for contributing new information to the definition of cultural or regional styles of ancient Iranian metalwork and their chronology.

## The Problem of Forgeries

Given the large quantity of metal artifacts that have appeared on the antiquities market in the twentieth century; commercial pressures from dealers, collectors, and museums; and the extreme paucity of material from controlled excavations, the problem of forgeries is common to all museum collections of ancient Iranian metalwork. Recent research employing traditional methods of connoisseurship, involving the analysis of shape, decoration, iconography, and style, has contributed new criteria for authenticating those classes of metalwork that have been studied systematically, such as Sasanian silver plate. In conjunction with this approach, considerable progress has been achieved in the technical study of many objects, with significant practical results for determining authenticity.[28] Yet neither art-historical nor technical study alone has yielded unequivocal criteria for determining authenticity, and no broad conclusions can be drawn from a limited corpus. This study has sought instead to provide a detailed analysis of each object in the collections from a variety of perspectives, contributing new empirical evidence that can be added to future investigations of Iranian metalwork.

Five objects in the collections previously published or exhibited as examples of ancient Iranian metalwork have been isolated as suspected forgeries and are discussed separately at the end of the catalogue [43–47].

### Notes

1. Auth 1983 describes Freer's collection of Egyptian antiquities, with special reference to an important group of glass vessels.

2. To the best of my knowledge, the first silver objects of Sasanian date acquired by a North American collection were a plate and an elliptical bowl purchased by Henry Walters in 1924; they remain in the permanent collection of the Walters Art Gallery, Baltimore. For these objects, see Ghirshman 1953, 51 n. 1, figs. 1–3; and Grabar 1967, 100–101, no. 13, with bibliography. I have not undertaken a detailed study of the subject.

3. The Peroz-Kavad I plate in the Metropolitan Museum of Art, New York, allegedly from northwestern Iran, was also acquired in 1934; Harper and Meyers 1981, 64 with n. 124. Noonan 1982 reviews the silver finds in the Perm region traditionally grouped as "Sasanian" and provides extensive bibliography.

4. Ackerman 1940, 325.

5. Grabar 1967, 19–84, summarized what was then known of Sasanian silver vessels and sculptures. See also the helpful overview in Harper 1983, esp. 1113–16.

6. Atıl 1971. The catalogue entries here

supply the exhibition history of each object.

7. Grabar 1967, 120, no. 35. Grabar's essay, 19–84, remains an insightful and valuable analysis of problems concerning the study of Sasanian and related precious metalwork.

8. Gettens and Waring 1957, 83–90.

9. Chase 1968, 78–93.

10. Harper and Meyers 1981, esp. 10–12, 124–42, 145–58, with bibliography.

11. The Sackler Gallery also houses approximately eighty metal artifacts of pre-Achaemenid date, most of them collected by Arthur M. Sackler. Selected objects have been published in Lawton et al. 1987, 26–31, 34, 36–41; and Porada 1990, 71–79. A future publication prepared by Paul Jett and myself will be devoted to this material, which has no counterpart in the Freer collection.

12. Major studies, all with extensive bibliography, include Moorey 1971; Winter 1980; Negahban 1983; Tallon 1987; Muscarella 1988; Winter 1989.

13. See above, n12.

14. Moorey 1985, 856–63, provides a helpful summary; also Moorey 1980a, 128–42, for an overview of metalwork production in various regions of the empire. Muscarella 1988 provides an informative treatment of the Metropolitan Museum's collections of objects of Achaemenid date.

15. Callatay 1989.

16. Detailed publication and technical study of excavated metalwork includes Stronach 1978, 168–78; Waldbaum 1983, with technical studies by Pieter Meyers. Additional examples from Asia Minor promise, when fully published, to provide a large and extremely important corpus of Achaemenid period metalwork. Muscarella 1988 includes technical information on some of the Metropolitan Museum's excavated objects of Achaemenid date.

17. A series of articles by Oscar W. Muscarella has helped assemble and categorize the material and serves as a useful critical first step: 1977, 153–207; 1979; and 1980, 23–42. See also the meticulous study by Moorey 1980a, esp. 128–42.

18. Lefebvre 1924, chap. 5.

19. Moorey 1988, esp. 238–43. Root 1991 examines issues of ethnicity, nomenclature, and regional style in the art of the Achaemenid Empire.

20. Rice 1983, 71–77; Callatay 1989.

21. Pope 1964–65, 459–70, is out-of-date. Colledge 1977, 123–24; and Musche 1988, with extensive bibliography, provide more recent surveys. Curtis 1976 discusses excavated metalwork from Nineveh. Kuhrt and Sherwin-White 1987 and Holt 1988 assess the interaction between indigenous and foreign traditions in West and Central Asia; both volumes contain rich bibliographies.

22. Oliver 1977; Pfrommer 1987.

23. For early publications of these collections, see Chabouillet 1858 (Bibliothèque Nationale, Paris); Smirnov 1909 (Hermitage Museum, Saint Petersburg); and Dalton 1964 (British Museum, London).

24. Recent discussions of the relevant finds, with extensive reference to Chinese publications, include Shih Hsio-yen 1983, 63–82; Rawson 1986, 31–56; also Harper 1990.

The influence of Sasanian silver on metalwork and ceramics of Tang dynasty China (A.D. 618–906) has been reexamined by several authors, some of whom suggest instead the primary role of Central Asian (especially Sogdian) metalwork in this process. Discussions include Medley 1970, 16–22; Melikian-Chirvani 1970, 9–15; Marshak 1971; cf. Rawson 1982, 6.

25. Key studies are Marshak 1971, 109–55 (English summary); Harper and Meyers 1981; Harper 1983, 1113–29; Marshak 1986, esp. 23–95, 239–96; Trever and Lukonin 1987; Harper 1988b, 153–61. A recent review article outlines new trends in the study of Roman silver plate, which are relevant to the study of late antique metalwork from West and Central Asia: Johns 1990, 28–43.

26. Harper and Meyers 1981, esp. 5–13, 124–42, 157–58.

27. Harper and Meyers 1981, 139–41.

28. Chase 1968; Moorey 1971, 34–36; Gibbons et al. 1979; Harper and Meyers 1981, 145–58; and Jett, in this volume.

# *Shapes and Decoration*

MOST OF THE ANCIENT Iranian metalwork in the Freer and the Sackler Gallery collections consists of vessels. With few exceptions, the shapes and decorative repertory of ancient Iranian metal vessels are closely related and are most profitably examined together. Other objects are discussed briefly at the end of each chronological section.

## Achaemenid Period (ca. 550–331 B.C.)

The empire established by the Achaemenid Persian dynasty from its homeland in Persis, in southwestern Iran, extended from southeastern Europe and Egypt to Central Asia.[1] Gold, silver, bronze, and iron were used throughout the Achaemenid Empire for vessels, weapons, and personal ornaments. Many types of objects and forms of decoration derive from earlier Iranian or West Asian metalworking traditions, including the shallow lobed drinking bowl (phiale), clothing appliqués cut from sheet metal, and zoomorphic decoration. Other products of the period, such as the rhyton with a drinking horn placed at right angles to the animal protome, appear to be Achaemenid innovations. By the mid-sixth century B.C., when the empire was formed, these metalworking traditions had long been established.[2] Beginning with the Achaemenid Empire and increasingly during the Seleucid, Parthian, and Sasanian eras, Iranian metalwork was also influenced by the forms, styles, and decorative techniques then flourishing in the eastern Mediterranean coastlands, in Egypt, and in Central Asia.

The metalwork produced by or for the Achaemenid court is attested in literary sources and illustrated in part among the vessels carried by tribute bearers in processions carved on stone reliefs at Persepolis in southwestern Iran.[3] Several examples of vessels made of precious metal, bearing inscriptions of the Persian king, suggest that the practice of giving vessels as royal gifts must have been common. Most inscribed examples, like the Freer silver phiale inscribed for the king Artaxerxes I (r. 465–425 B.C.), lack an archaeological provenance [3]. Inscribed vessels made of other materials that have been found in an undisturbed context suggest that such vessels were circulated extensively, both within the empire and beyond its frontiers.

The seven objects in the Freer and the Sackler galleries assigned to this period add relatively little to the material yielded by controlled excavations or acquired for other museum collections. Three are phialae, two of high-tin bronze [1, 2] and one of silver [3]. A bronze jug seems to be inspired by Egyptian metalwork of the late Achaemenid or early Ptolemaic period [4].

Three objects made of gold, a pair of zoomorphic vessel handles [43] and a cup terminating in the form of a ram's head [44], have previously been published as examples of Achaemenid metalwork. They are almost certainly of modern manufacture.

## Seleucid and Parthian Periods (ca. 312 B.C.–A.D. 224)

Following the conquests of Alexander (r. 336–323 B.C.) in the late fourth century B.C., extensive Asian regions of the Achaemenid Empire came under the control of Seleucus (r. 305–281 B.C.) and his successors. In the third century B.C., a dynasty that reckoned its descent from a local ruler named Arsaces conquered Parthia in northeastern Iran and began a westward advance that eventually brought much of the former Achaemenid Empire in West and Central Asia under its control or influence.[4]

Only a few objects in the Freer and the Sackler collections can be dated to these periods, and most are unusual. A silver bowl with a low ring foot [5], dating to the Parthian era, illustrates the influence of the Achaemenid phiale. A silver bowl with an interior medallion enclosing a figure is a rare product of the late Parthian period [6]. It also represents an important prototype for the early Sasanian group of silver bowls with an interior medallion enclosing a human bust [24]. A bronze vessel handle in the form of a panther [8] has connections to vessels with zoomorphic handles from both Greek and Near Eastern worlds.

The three horn rhyta [9–11] are a relatively well-known type illustrating the Parthian version of the ancient Iranian vessel fashioned entirely or in part in the form of an animal.[5] The rhyton of Seleucid and Parthian date, with its slender, elongated horn decorated with foliate band and small animal protome, is derived from the rhyton developed in Achaemenid times. The history, variety, distribution, and chronology of the type are becoming better known through discoveries made during the last few decades in Bulgaria.[6] For the horn rhyton of Parthian times, the principal sources of information are the forty examples made of ivory recovered from the early Parthian capital of Nisa, located in Turkmenistan.[7] A number of silver-gilt rhyta of Parthian date, allegedly from Iran, have appeared on the antiquities market over the past twenty years and document a healthy production of this vessel type [see 9–11].

A small gold object with animal decoration was probably used to adorn a belt or other article of dress [12].

The silver head of a female has previously been published as a work of Parthian sculpture [46]. It is almost certainly a modern forgery.

## Sasanian Period (ca. A.D. 224–651)

The triumph of Ardashir (r. A.D. 226–41) over the Parthians in the year 224 introduced a long period of rule over West and Central Asia by the Sasanian dynasty, whose homeland lay in southwestern Iran.[8] Most ancient Iranian metal artifacts in the Freer and the Sackler Gallery collections catalogued here, thirty objects in all, belong to this period.

Most of the Sasanian metalwork in the collections consists of silver vessels. In general, Sasanian silver plate is modeled on Roman, Byzantine, and, to a much lesser extent, Central or East Asian prototypes.[9] Since the nature of silver production under the Parthians is little known, the relationship between the Parthian and Sasanian eras in regard to metalworking traditions is difficult to gauge precisely. Most Sasanian silver vessels are decorated with figural subjects that have a political or religious meaning. In this respect Sasanian plate appears to depart from earlier traditions. The concept of the picture plate was developed in the West during the first century of the common era. Relatively few examples of native Iranian forms occur. The horn rhyton with animal protome [38] is one of the few long-lived Iranian vessel types that continues into the Sasanian period. Yet the form of decoration characteristic of Sasanian silver plate, consisting of separately made pieces of silver attached to the vessel surface and then worked and gilded, elaborates an ancient Iranian technique best known from the Achaemenid period.[10] Moreover, the theme of the royal hunter, well illustrated in Sasanian silver, is traditional in the ancient Near East and is attested on monuments of the Parthian era in Iran.[11] A more substantial Iranian role in Sasanian metalwork may be suspected but cannot be fully elaborated with evidence now available from the Seleucid and Parthian eras.

The Freer and the Sackler Gallery collections of Sasanian metalwork together form a rich corpus and illustrate a wide range of the known repertory of silver plate. Nearly every principal type of silver vessel and decorative treatment is represented, including royal hunting plates, medallion bowls, small hemispherical bowls with exterior decoration, ewers, vases, elliptical bowls, lobed elliptical bowls, and high-footed circular bowls. In addition, several examples of unusual form or decoration contribute important evidence for understanding the repertory of Sasanian silver production, its techniques of manufacture, and chronology. The scope of the collections spans most of the Sasanian period. Rare examples of early Sasanian silver date from the end of the third or to the fourth century [13, 24, 38]. The collections are richest in late Sasanian metalwork, works from the sixth and seventh centuries.

In subject and decorative repertory, the Freer and the Sackler collections illustrate themes encountered in other examples of Sasanian silver plate. These include royal imagery consisting of hunting and banqueting scenes [13–15, 18]. Images of the god Dionysus, rare in Sasanian art, are depicted on a plate [16] and a vase [33]. More common in Sasanian silver are figures probably derived from Roman representations of the followers of Dionysus or personifications of the Seasons and the Months; examples in the Freer and the Sackler galleries are a vase [34] and two ewers [35, 36]. Rare in Sasanian art in any medium are genre scenes. A hemispherical bowl is an unusual example depicting scenes from the life of the Sasanian nobility [25].

A number of Sasanian silver-gilt vessels bears inscriptions, generally in Middle Persian or Sogdian. The inscriptions usually name the owner and often give the weight of the vessel in *drahm* [see 21, 34, 35]. Some of the inscriptions may be contemporary with the vessels on which they are found, but many must have been added after the date of manufacture.[12]

## *Types Represented*

CIRCULAR PLATES. Among the most common types of Sasanian silver vessels are circular plates measuring about twenty-five centimeters in diameter, which rest on a low ring foot. This shape is derived from Hellenistic and Roman ceramic and metal vessels; a rare Parthian predecessor made of silver bears engraved figural decoration on the interior [6].

The nine examples of Sasanian date in the Freer and the Sackler Gallery collections are subdivided by the subject of decoration or by formal characteristics of the plate itself.

ROYAL HUNTING PLATES. A principal category of Sasanian silver vessels, and the one most extensively investigated, consists of plates depicting a royal hunt. Two hunting plates are in the Freer Gallery of Art [13, 14] and one is in the Sackler Gallery [15].

The Sasanian royal hunting plates have been known and studied since the early nineteenth century, when they were found in Russia and gradually made their way into a number of European collections. Early in the history of modern investigation the figures depicted on the plates were compared with previously known categories of Sasanian royal art, such as coins, seals, and rock reliefs. These comparisons offered opportunities for dating as well as determining authenticity, possibilities not available among other categories of Sasanian metalwork. Yet close parallels between the plates and other categories of royal representations did not always exist. Moreover, the appearance of hunting plates on the antiquities market in the twentieth century, most with an alleged Iranian provenance, introduced new problems of authenticity.[13]

A comprehensive study by Harper and Meyers, published in 1981, identified important new criteria to aid in determining the authenticity, relative chronology, and place of manufacture of the royal hunting plates. Subgroups were defined on the basis of techniques of manufacture and decoration, composition and design, and drapery style. Research by Harper and Meyers has discerned a close correspondence between technical, typological, iconographic, and stylistic features of the plates and has also helped distinguish the products of royal and nonroyal workshops.[14]

The hunting plates in the Freer and the Sackler Gallery collections are assigned to categories defined by Harper and Meyers. The "Stroganov plate" depicting the king Shapur II hunting boars [13] and a second hunting plate [14] belong to a group isolated as "central Sasanian" vessels produced under direct royal control. A third hunting plate [15] relates to another subgroup characterized by a simple engraved style of decoration and the use of spot gilding; the crowns worn by the hunters on plates in this subgroup do not correspond to types known from Sasanian official art. The simplicity of technique, style, and composition of this subgroup suggests that they are products of a provincial workshop, perhaps made at the end of the Sasanian era or in early Islamic times, when local workshops produced imitations of Sasanian court silver.

PLATES WITH FLUTED EXTERIOR. Another typological subgroup is the silver-gilt plate with fluted exterior and interior figural decoration. Four examples are in the Sackler Gallery, but the type is not well represented among other collections.[15] Exterior fluting on a circular plate with low ring foot seems to be a feature introduced late in the Sasanian period. A plate with exterior fluting was found by chance at Lenkoran in Azerbaijan. The Lenkoran plate has a deep bowllike form with decoration on the interior but lacks a ring foot. The style of its decoration suggests a seventh-century date.[16]

Three of the four Sackler Gallery plates bear interior ornament in the form of a single animal [19–21]. The fourth plate depicts a banqueting couple [18].

BOWLS. Metalsmiths of the Sasanian period fashioned bowls in a variety of forms. Most types known from this period are represented in the Freer and the Sackler Gallery collections by one or more examples.

Deep hemispherical bowls decorated with heads or busts enclosed in a medallion constitute a distinctive category of early Sasanian silver plate [24]. Small hemispherical bowls bearing genre or narrative scenes on the exterior are assigned to the end of the period [25]. High-footed bowls with fluted exterior, a shape introduced from the Roman and Byzantine West, resemble plates but are deeper and rest on a high conical foot [26]. A shallow bowl or boss with elaborate figural decoration on the exterior belongs to a small group of vessels probably made in Bactria and recently reassigned by some scholars to the Sasanian period [23].

Elliptical bowls form a large category of Sasanian metalware. Harper has recently reviewed them in detail, distinguishing several subgroups based on the overall form of the vessel, the presence or absence of a foot, and the location and subject of decoration.[17] Unusual among Sasanian silver plate, the elliptical or boat-shaped bowl is represented by a few excavated examples, made of silver or copper alloy, recovered from sites in southern Iran and Mesopotamia. Five bowls, illustrating the subgroups distinguished by Harper, are in the Freer and the Sackler Gallery collections.

Elliptical bowls without a foot, decorated on the interior or the exterior or both, are represented in the collections [27, 28]. This form may have had a Chinese origin; while a "winged" version of the shape existed in East Asia, no West Asian antecedents are known.[18] It entered the Sasanian repertory in the mid-fifth to early sixth century; in the late Sasanian and early Islamic eras the shape was copied in high-tin or "white" bronze, also known as speculum metal.[19] Befitting a vessel type used for drinking wine, Dionysiac imagery is common; vine scrolls and single figures of felines, leopards, and tigers occur as interior or exterior ornament [27]. Another subgroup comprises the compressed elliptical bowl [29].

Related to the group is the lobed elliptical bowl, of which there are two examples in the Sackler Gallery [30, 31]. Such bowls with a low foot may be a Central Asian (Sogdian) vessel type, as indicated by representations of such vessels among the wall paintings found at the Sogdian city of Panjikent, dating to the seventh and eighth centuries.[20] This vessel type is of considerable interest in the broader study of Asian metalwork and culture of the first millennium because of its relationship to silver versions produced in China during the Tang dynasty (A.D. 618–906) and to examples preserved in the Shōsōin Repository in Nara, Japan.[21]

VASES. Also known as bottles, vases are well represented among museum collections of Sasanian silver. The vessel form itself is probably of Roman origin.[22] Sasanian vases are a narrowly defined type, with a pear-shaped or globular body; flat, circular base; and offset rim, often inscribed. A molding separates the neck and body, and the body is usually embellished with repoussé decoration on a gilded background. Three examples are in the Freer Gallery, two with figural decoration [33, 34] and one with geometric ornament [32]. Vases are closely related in form, function, and decoration to ewers (described below).

Catalogue numbers 33 and 34 belong to a group of silver-gilt vases bearing repoussé decoration in the form of human figures, often pairs of figures, placed around the body of the vase; sometimes the figures are separated by architectural frames. Dionysiac imagery is common in this group of vessels used to contain wine.[23] A vessel decorated with figures including the god

Dionysus and a maenad explicitly illustrates this theme [33]. A group of silver-gilt vases and ewers depicts dancing female figures holding musical instruments [34]; a ewer with related decoration is in the Sackler Gallery [35].

EWERS. Ewers, or vase-shaped pitchers, probably entered the repertory of Sasanian silver plate from the Roman world.[24] They continued to be made, with relatively little alteration in shape, in the early Islamic period.[25] Three ewers illustrate the type with pear-shaped bodies, moldings separating the neck and foot, and handles terminating in the form of an animal head [35–37]. On two of the examples, the body of the ewer is decorated in repoussé with female figures [35, 36].[26]

Archaeological and representational evidence dates the Sasanian silver-gilt ewers primarily to the sixth and seventh centuries. An example made of gold and lacking decoration on the body was found in the hoard from Pereshchepina, north of the Black Sea; it is now in the Hermitage Museum.[27] On a relief in the large iwan at Taq-i Bustan in western Iran, probably built by the Sasanian king Khusro II (r. A.D. 591–628), a figure identified as the Iranian goddess Anahita holds a ewer of the same shape.[28] Ewers are also depicted on Sasanian silver vessels that are dated independently, on stylistic or typological grounds, to the sixth and seventh centuries. On a hemispherical bowl is shown a pair of ewers in a scene depicting preparations for a banquet [25]. These representations suggest a late date for the group as a whole.[29] The find of a Sasanian-type ewer with figural decoration in China in a Northern Zhou (A.D. 557–81) tomb closed in A.D. 569 indicates that the shape may have already been introduced in Sasanian Iran by the mid-sixth century.[30]

Where the ewers were made, and for whom, remains uncertain. Both ewers and vases have been found in the Perm region west of the Ural Mountains of Russia and were therefore part of the repertory of Sasanian silver plate exported beyond the frontiers of the empire. They must have been valued as gift items or as trade goods. Perhaps, like the royal hunting plates, ewers and vases had a donative significance and were sent abroad as royal gifts. Many examples, however, including those in the Freer and the Sackler Gallery collections, are reportedly from Iran, and at least some must have been made for members of the Sasanian nobility.

In addition to their evident popularity in the Sasanian world, ewers had a significant influence on the repertory of vessel shapes in Central Asia and China, where they were made of precious metal or produced in ceramic versions.[31] It is noteworthy that ewers—and apparently not the related class of vases—had an impact on fashions in vessel manufacture east of Iran.

RHYTA. The Sackler Gallery's collection includes a rare example of the Sasanian rhyton [38]. To judge by extant examples, the horn rhyton with animal protome seems to have survived only into the early Sasanian period. Other ancient forms of the rhyton, including vessels made entirely in the form of an animal, appear in metal or ceramic and may have been produced throughout the Sasanian period. A silver horse rhyton, now in the Cleveland Museum of Art, dates to the early Sasanian period.[32] From the sixth or seventh centuries and probably of Sogdian origin are two silver-gilt vessels in the form of the head of a saiga antelope.[33] Another type of rhyton of this period combines the head of a female with the head of an animal; both silver and ceramic examples of this type survive.[34]

Persian literary references assembled and analyzed by A. S. Melikian-Chirvani document the continued production of the ancient Iranian rhyton in the form of a complete animal, and probably also the horned variety, well into the Islamic era.[35]

MISCELLANEOUS OBJECTS. A few objects in the collections are unusual types or are represented by a single example. A silver-gilt roundel, perhaps a container lid, has parallels in the form and style of its decoration among silver-gilt plates of the late Sasanian period [39]. A large silver-gilt disk with hammered and repoussé decoration is unique [40]. A gold sword handle and chapes and a silver-gilt buckle and set of gold lappet fittings belong to types known from other extant examples and from contemporary representations [41, 42].

A silver bust of a royal figure has previously been published and exhibited as a work of the Sasanian period [47]. Technical, typological, and stylistic evidence suggests that it is a modern forgery.

## Notes

1. Surveys of Achaemenid history and culture are found in Gershevitch 1985 and Boardman et al. 1988.

2. The antecedents of Achaemenid metalworking traditions have now been studied in greater detail. Recent studies include Curtis 1988, with extensive bibliography.

3. Walser 1966, 70–103; Callatay 1989; Lewis 1989. Schmidt 1957, 87–88, discusses the vessels depicted on the reliefs, together with examples of stone vessels recovered from Persepolis.

4. Surveys of Seleucid and Parthian history, with extensive bibliography, are found in Yarshater 1983; also Kuhrt and Sherwin-White forthcoming.

5. The history of the ancient Iranian rhyton has been reviewed by several authors; an important study remains Ghirshman 1962a, 57–80; the Seleucid and Parthian history of the type is examined by Masson and Pugačenkova 1982, esp. 38–42, with bibliography.

6. For discussions of the Achaemenid rhyton, see Strong 1966, 86–87; also Moorey 1980a, 26–27, with additional references. The Bulgarian finds in precious metal are illustrated and discussed in *L'or des cavaliers thraces* 1987 and examined further in Zazoff et al. 1985 and Vickers 1991.

7. Masson and Pugačenkova 1982 is the definitive publication.

8. Yarshater 1983 provides surveys of Sasanian history and monuments.

9. This survey draws closely on the overviews provided by Harper 1983;

also Harper 1988b, both with rich bibliography.

10. Moorey 1988.

11. Kawami 1987, 149. Harper 1983, 1116–18; and Harper and Meyers 1981, esp. 126–27, 136–42, discusses the sources and meaning of the royal hunt in Sasanian art.

12. Gignoux 1984, with additional bibliography.

13. Harper and Meyers 1981, esp. 40–47.

14. Harper and Meyers 1981, esp. 124–42, 150–58.

15. Pieter Meyers has kindly informed us of two other examples of the type in European collections: Musées Royaux d'Art et d'Histoire, Brussels, with boar's head on interior (acc. no. IR 1194); Museo Nazionale d'Arte Orientale, Rome, with striding leopard on interior (acc. no. 8229/8297). These plates will be published in the forthcoming volume by Harper and Meyers.

16. Koshkarli 1985, 59, pl. XIII. The plate probably originally had a ring foot, now missing. My thanks to Prudence Harper for this reference.

17. Harper 1988a.

18. Harper 1988a, 336–37.

19. Muscarella 1988, 300–301, no. 428, with bibliography.

20. Azarpay 1981, 111, fig. 48.

21. Gyllensvärd 1957, 58–60; also Medley 1970.

22. Petrikovits 1969. The term for the shape in Roman metalware is "jar." Ceramic examples of the shape recovered from Sasanian sites are almost certainly copies of prototypes made of precious metal: Ettinghausen 1964–65, 665, fig. 226 (ceramic vase from Kish in southern Mesopotamia).

23. Ettinghausen 1967–68, 34–41; also Harper 1978, 71–73, no. 24, with bibliography and additional examples.

24. Strong 1966, 188–90, pl. 56A.

25. Atıl, Chase, and Jett 1985, 62–64. In the collections of the Hermitage Museum, Saint Petersburg, is a ewer similar to the late Sasanian examples but now generally classified as Sogdian: Orbeli and Trever 1935, pl. 49; also Marshak 1986, 55–56.

26. Harper 1978, 60–61, with bibliography, provides a discussion of the type.

27. Marshak 1986, fig. 89.

28. Pope 1964–65, 7: pl. 160B.

29. A banqueting scene on the interior of a silver plate in the Hermitage depicts a ewer decorated with architectural frames. The plate is probably post-Sasanian: Orbeli and Trever 1935, pl. 16.

30. The ewer is published in *Wenwu* 1985, no. 11: 1–20, pl. 1, fig. 23. Further discussions are found in Carpino and James 1989; Marshak and Wakou Anazawa 1989; also Wu Zhuo 1989. Another Sasanian-style ewer, similar in form to the gold example from the Pereshchepina hoard but with a cast human head attached to the top of the handle, was found together with other silver-gilt vessels of non-Chinese type in 1975 in a grave in Aohanqi, Liaoning Province. The burial probably dates to the early tenth century: *Kaogu* 1978, no. 2: 117–18.

31. Gyllensvärd 1957, 61–62; also Carpino and James 1989.

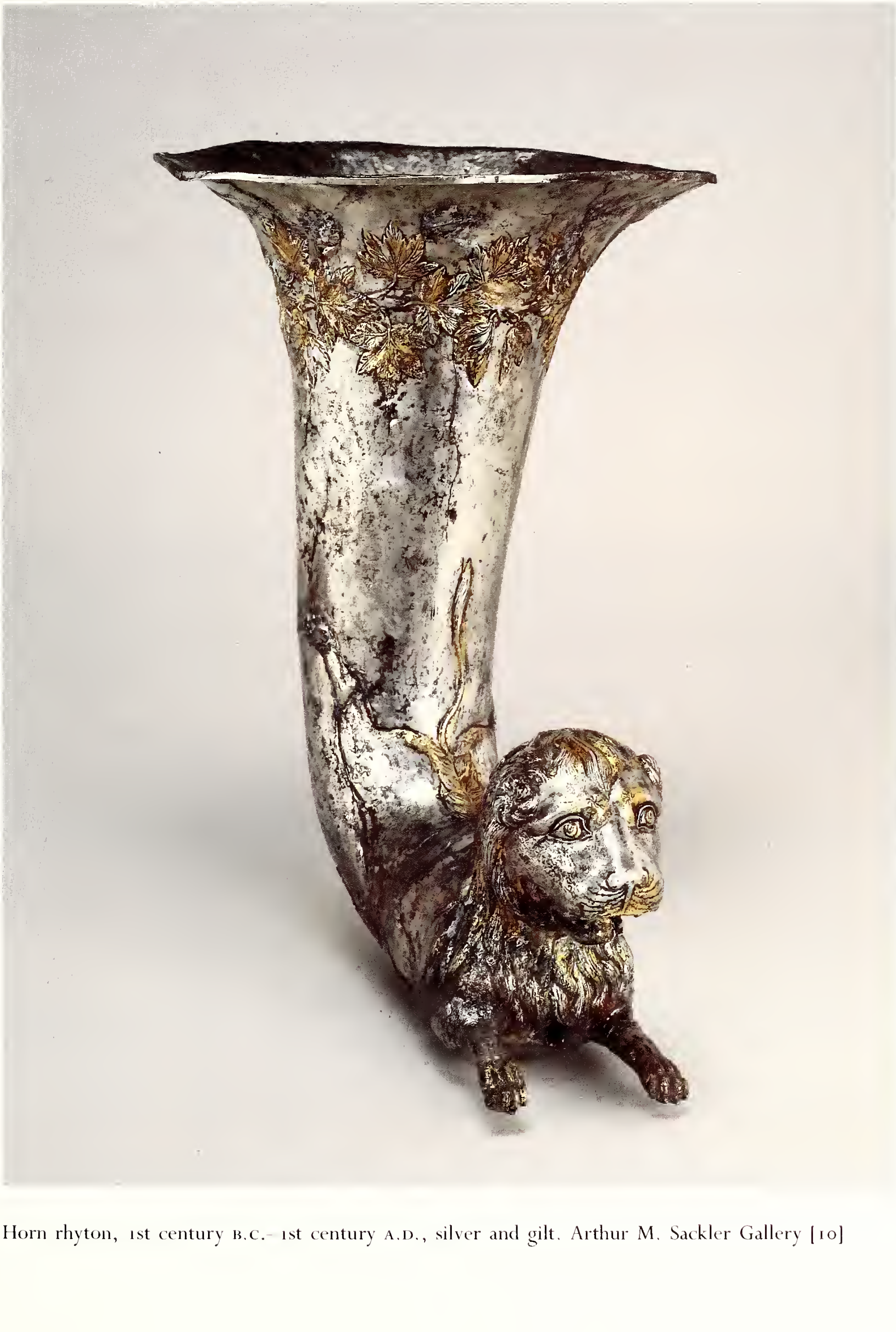
32. Harper 1978, 28–30, no. 1, with further references.

33. Harper 1978, 56–57, no. 16 (private collection); Kent and Painter 1977, 152, no. 319. Additional examples of the rhyton in the form of a complete animal are discussed by Melikian-Chirvani 1982, 264–75.

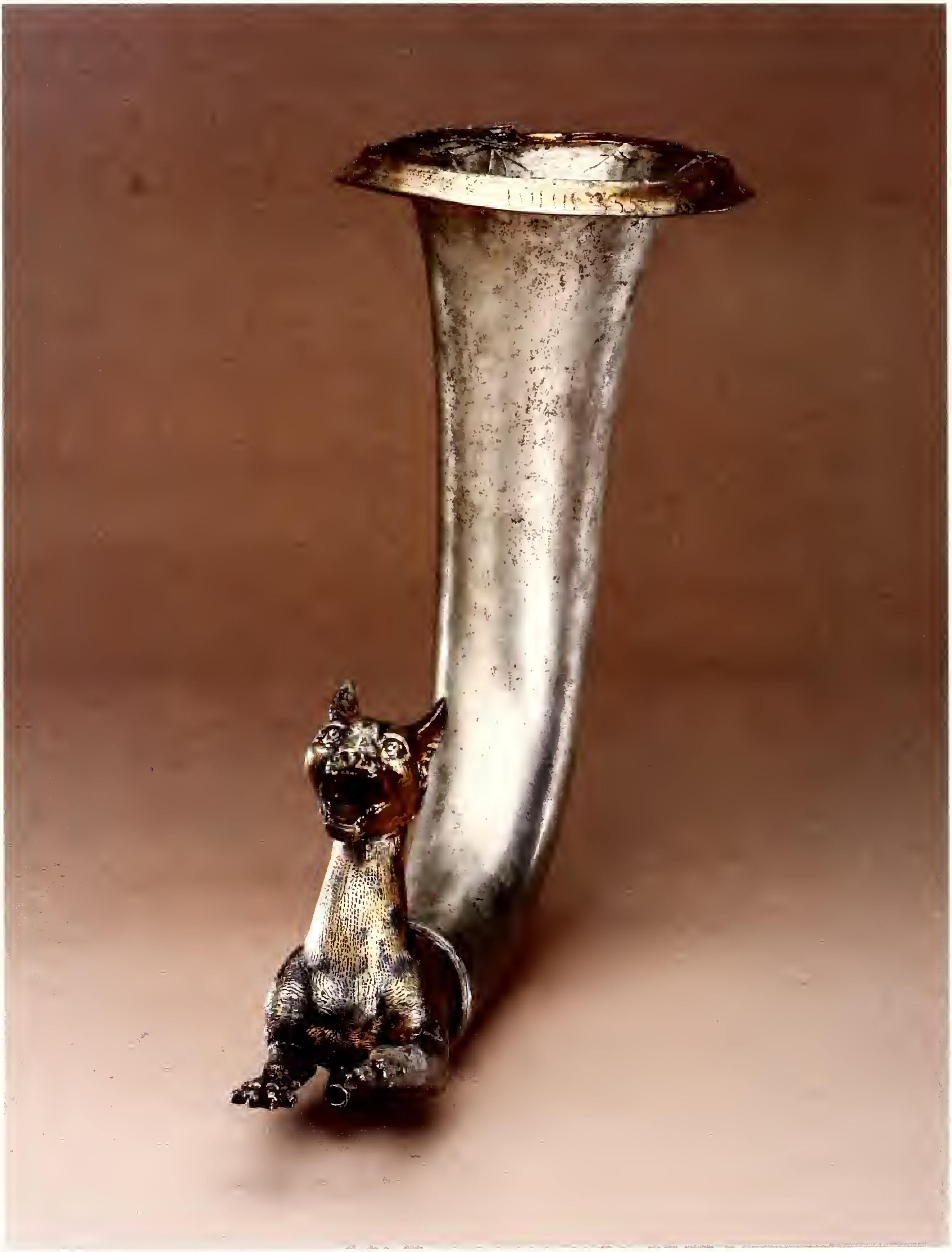
34. Harper 1978, 68–71 (no. 23), 162–64 (no. 84). The silver rhyton is also discussed by Carter 1979.

35. Melikian-Chirvani 1982.

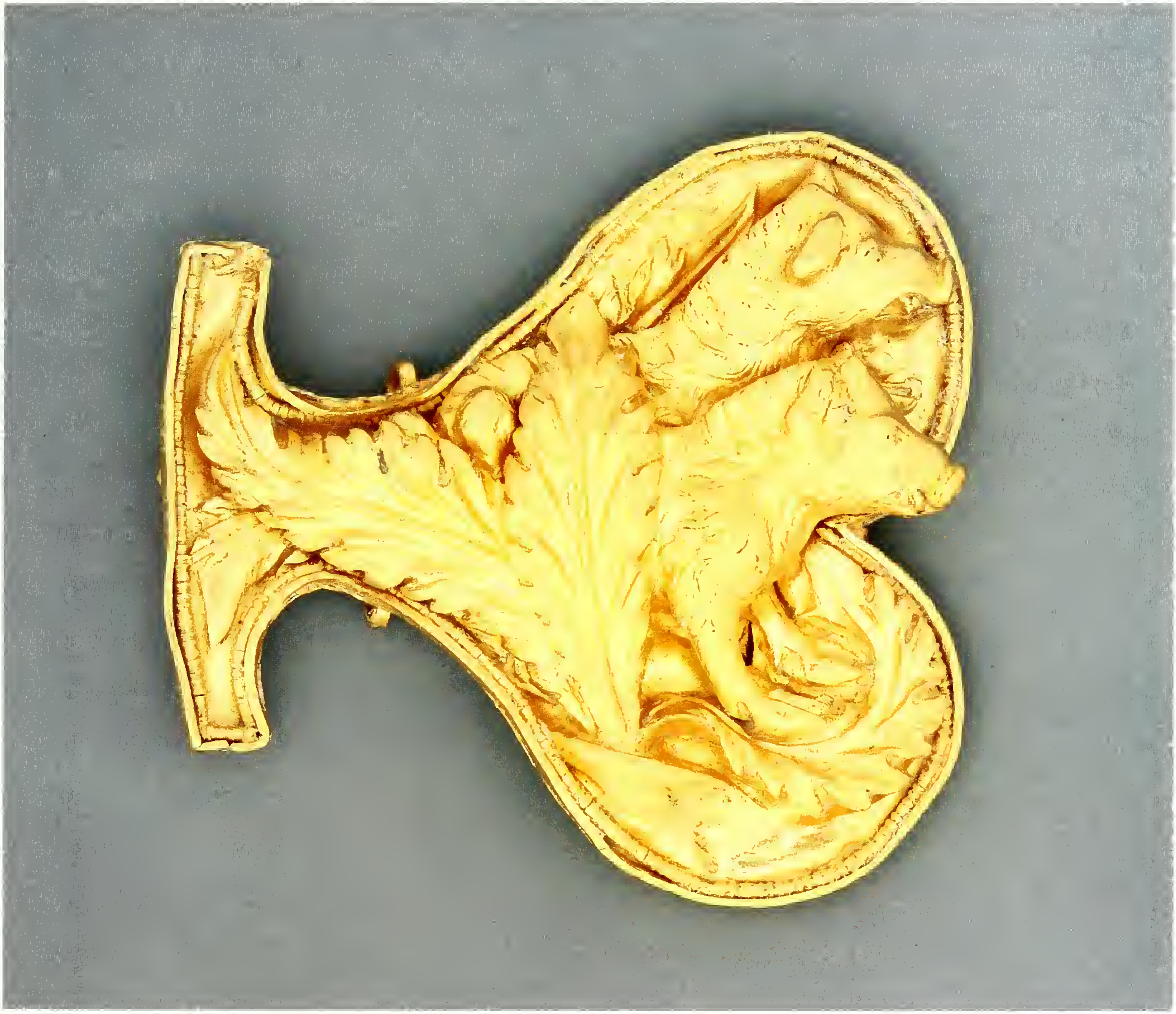
# *Colorplates*



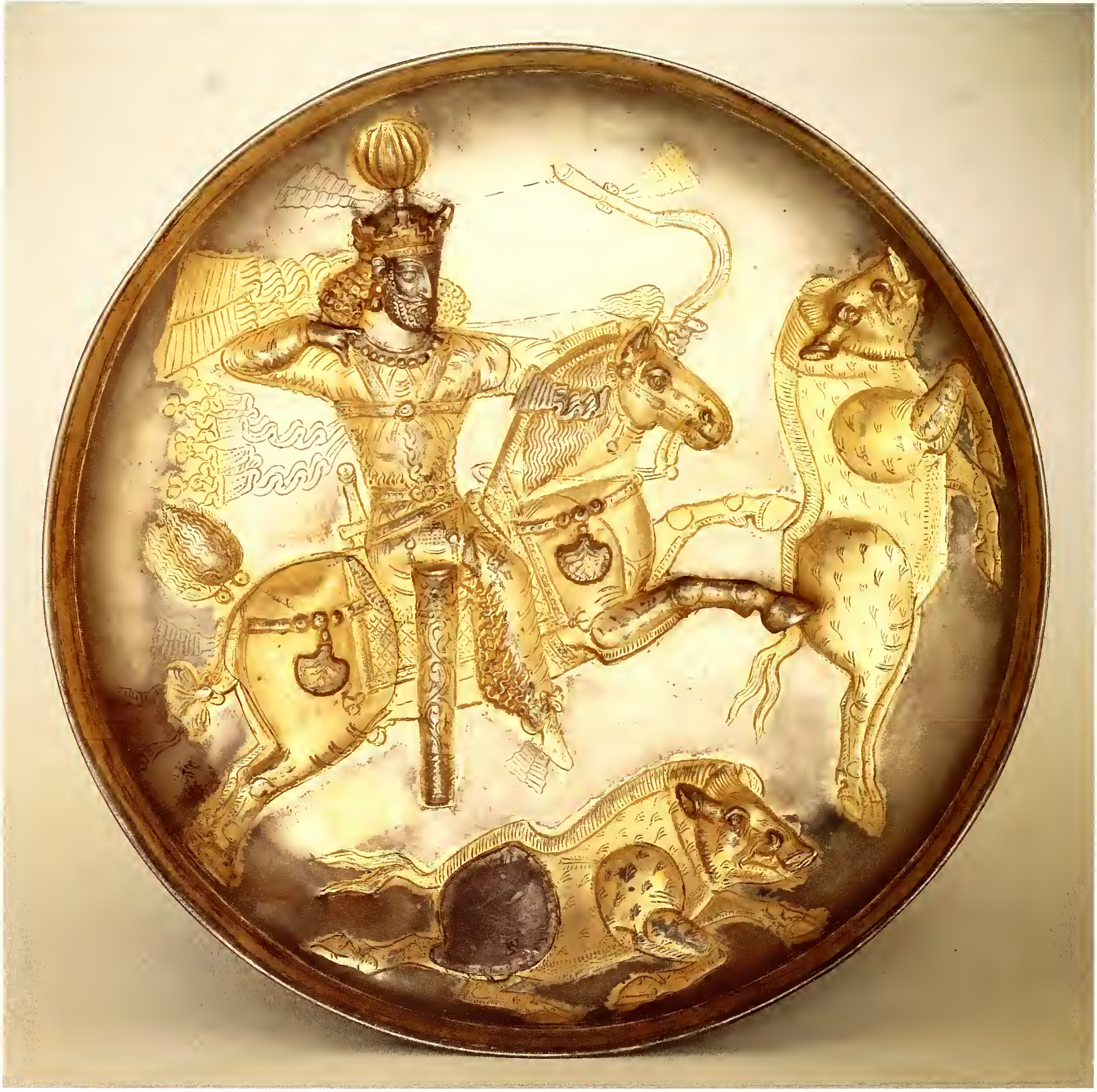
Horn rhyton, 1st century B.C.–1st century A.D., silver and gilt. Arthur M. Sackler Gallery [10]



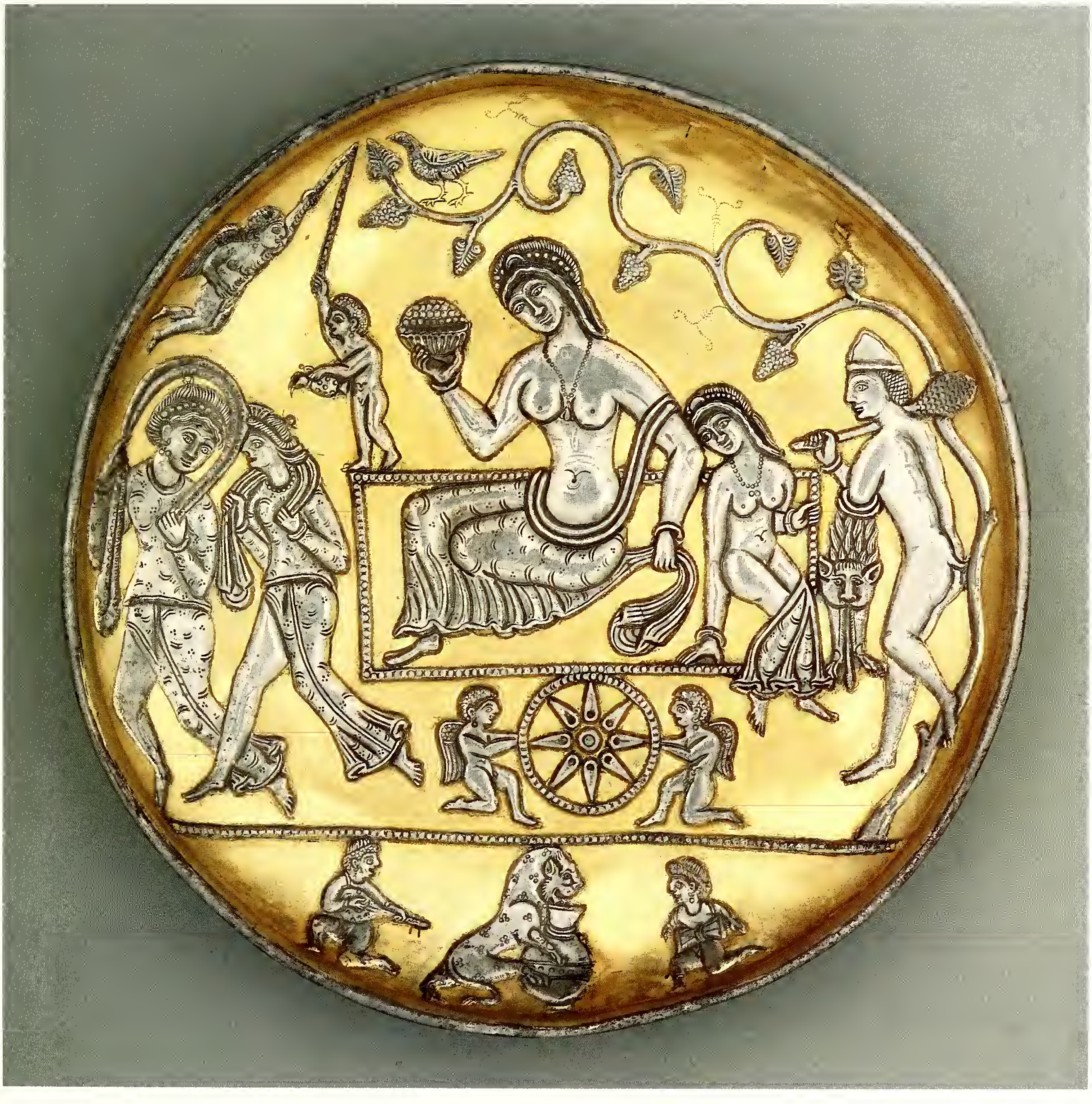
Horn rhyton, 1st century B.C.–1st century A.D., silver and gilt. Arthur M. Sackler Gallery [11]



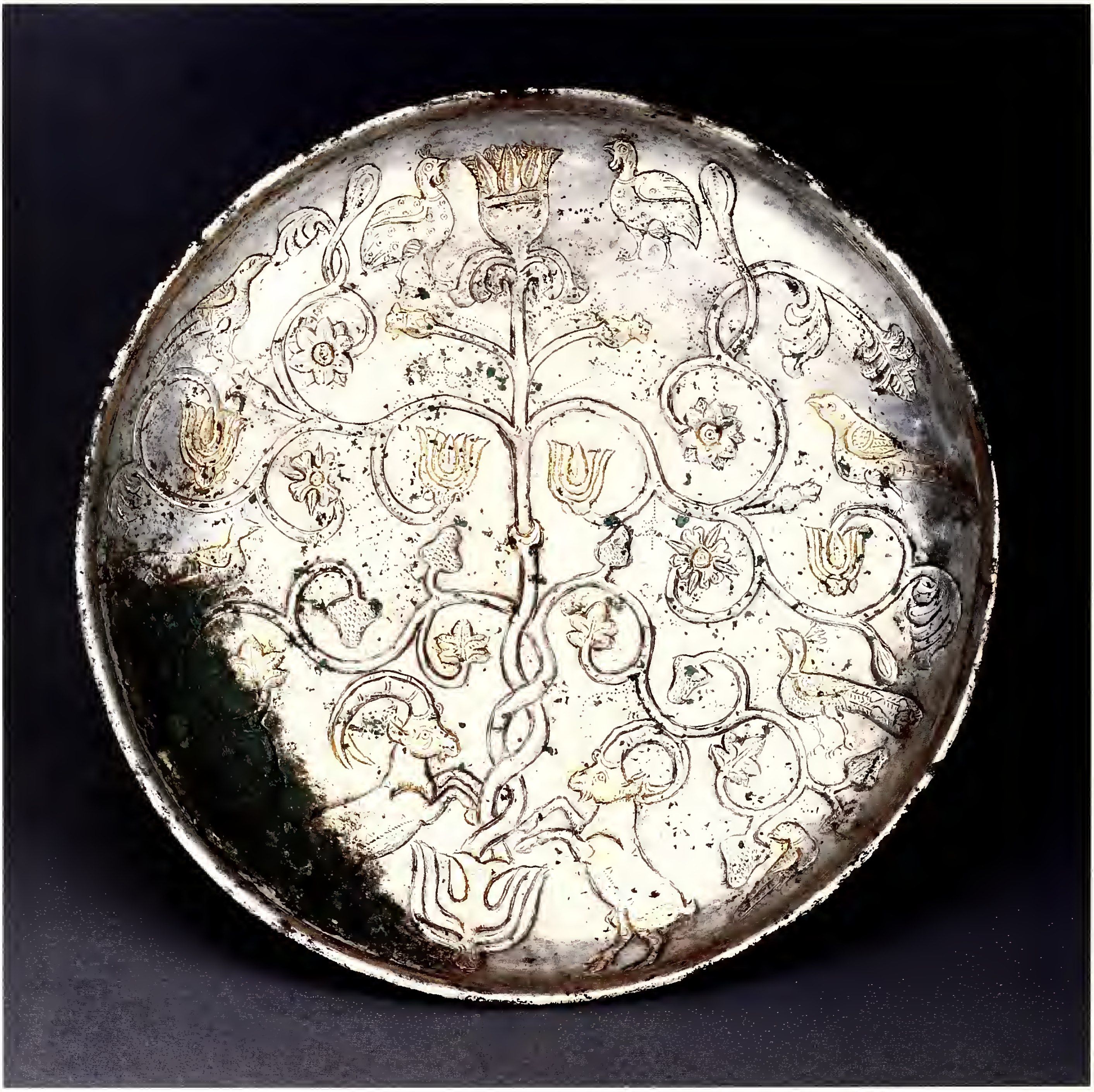
Heart-shaped ornament, 2d century B.C.–2d century A.D., gold. Freer Gallery of Art [12]



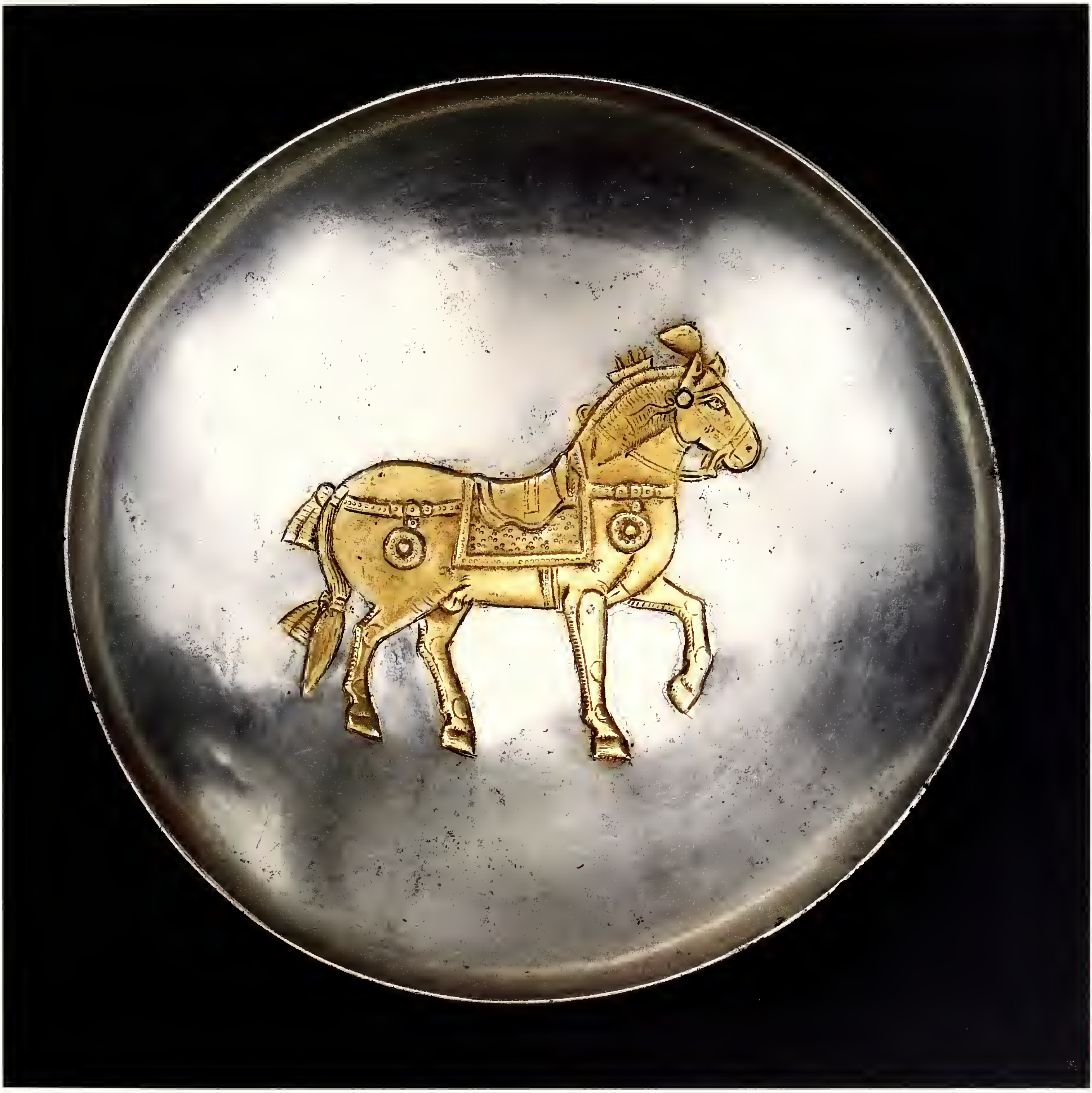
Plate, 4th century A.D., silver and gilt. Freer Gallery of Art [13]



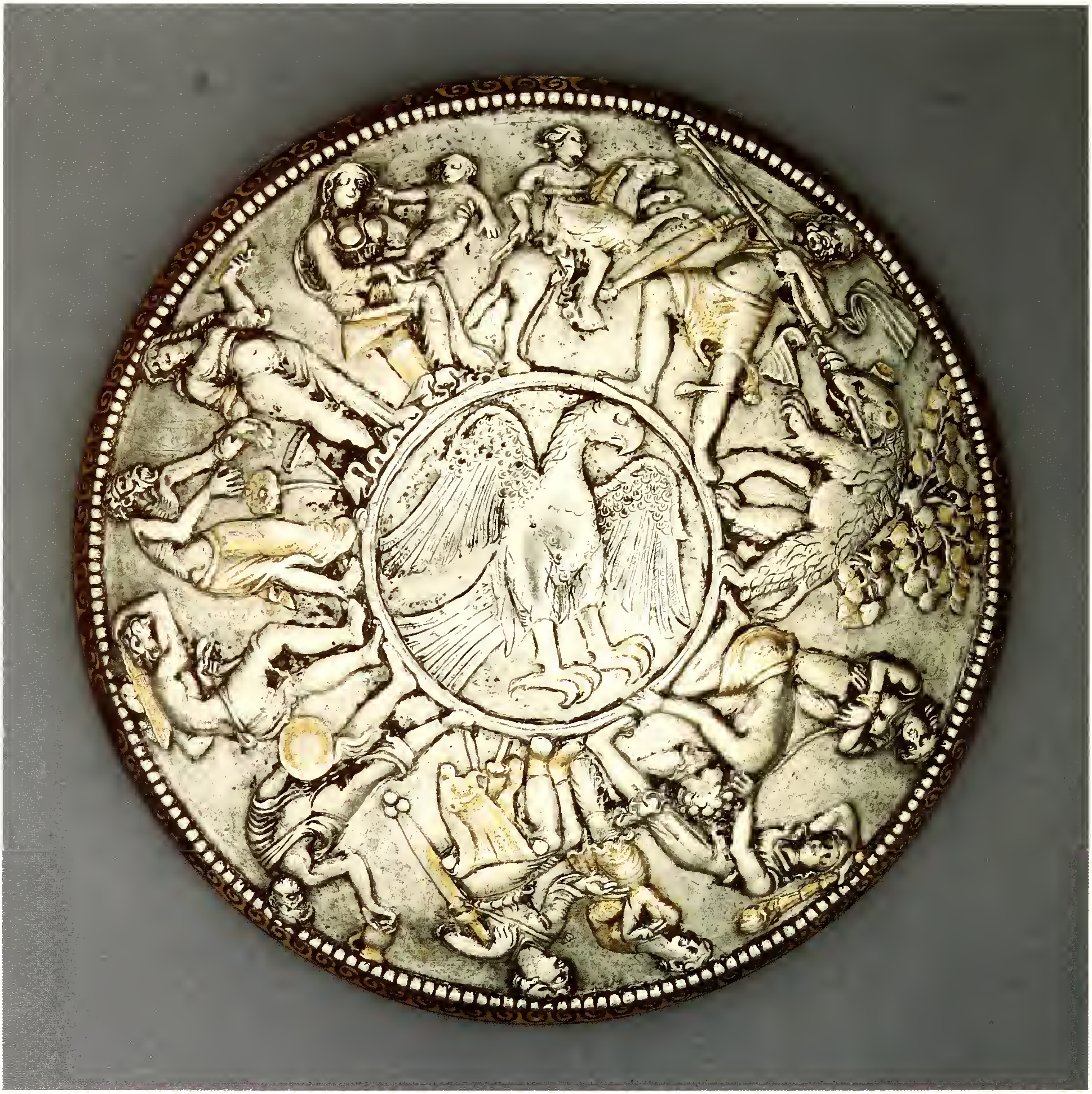
Plate, 5th–7th century A.D., silver and gilt. Freer Gallery of Art [16]



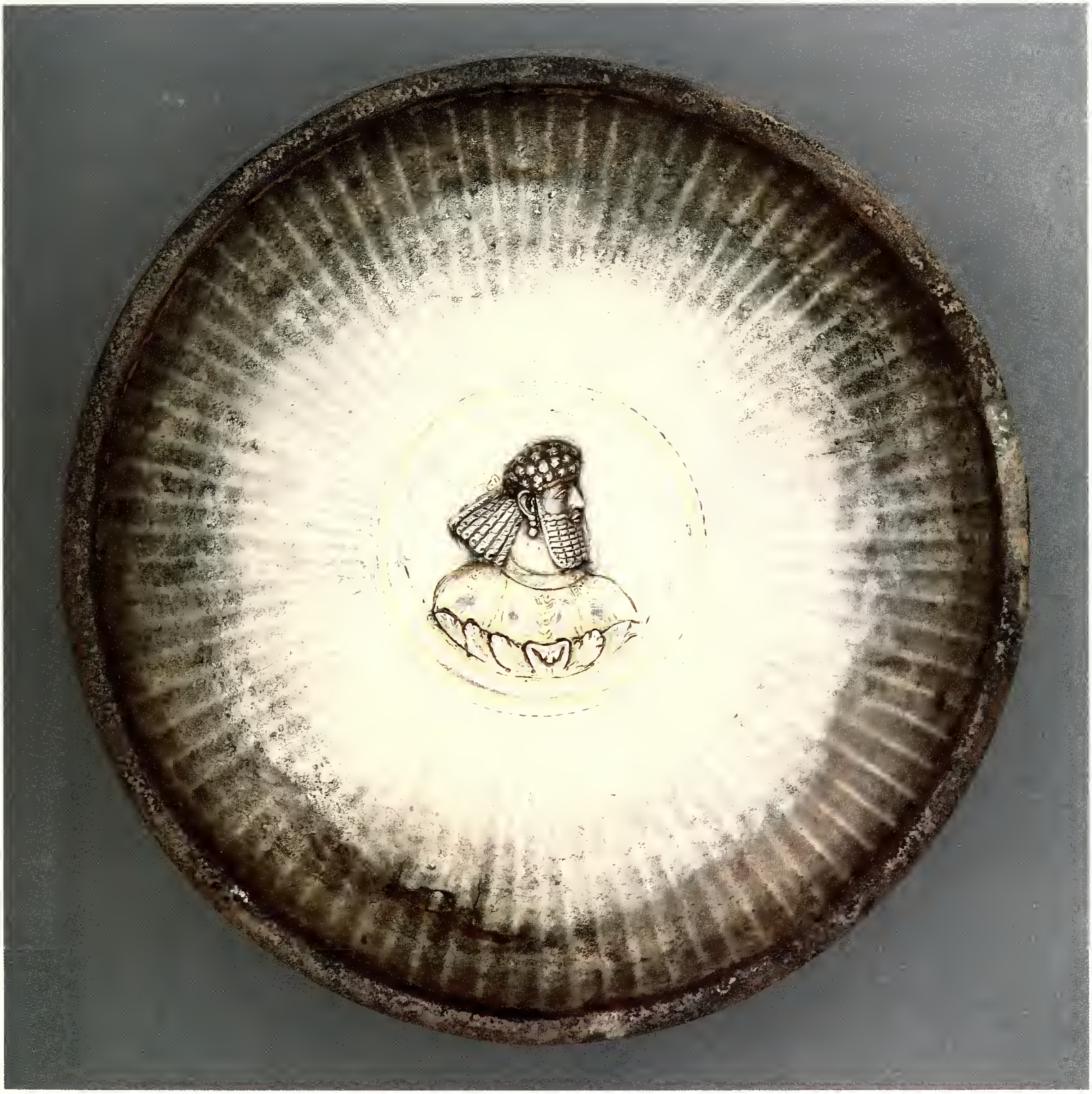
Plate, 6th–7th century A.D., silver and gilt. Arthur M. Sackler Gallery [17]



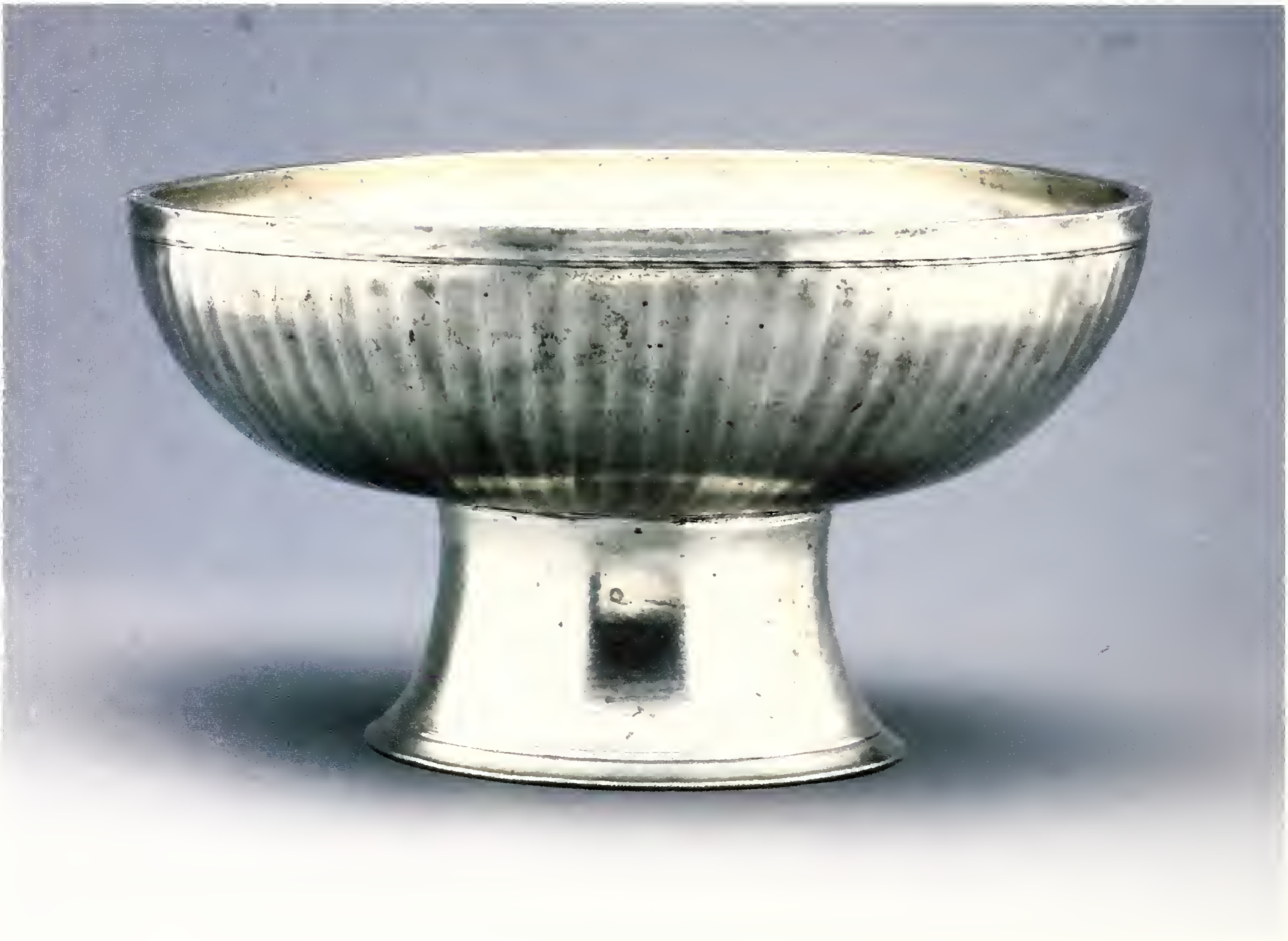
Plate, 6th–7th century A.D., silver and gilt. Arthur M. Sackler Gallery [20]



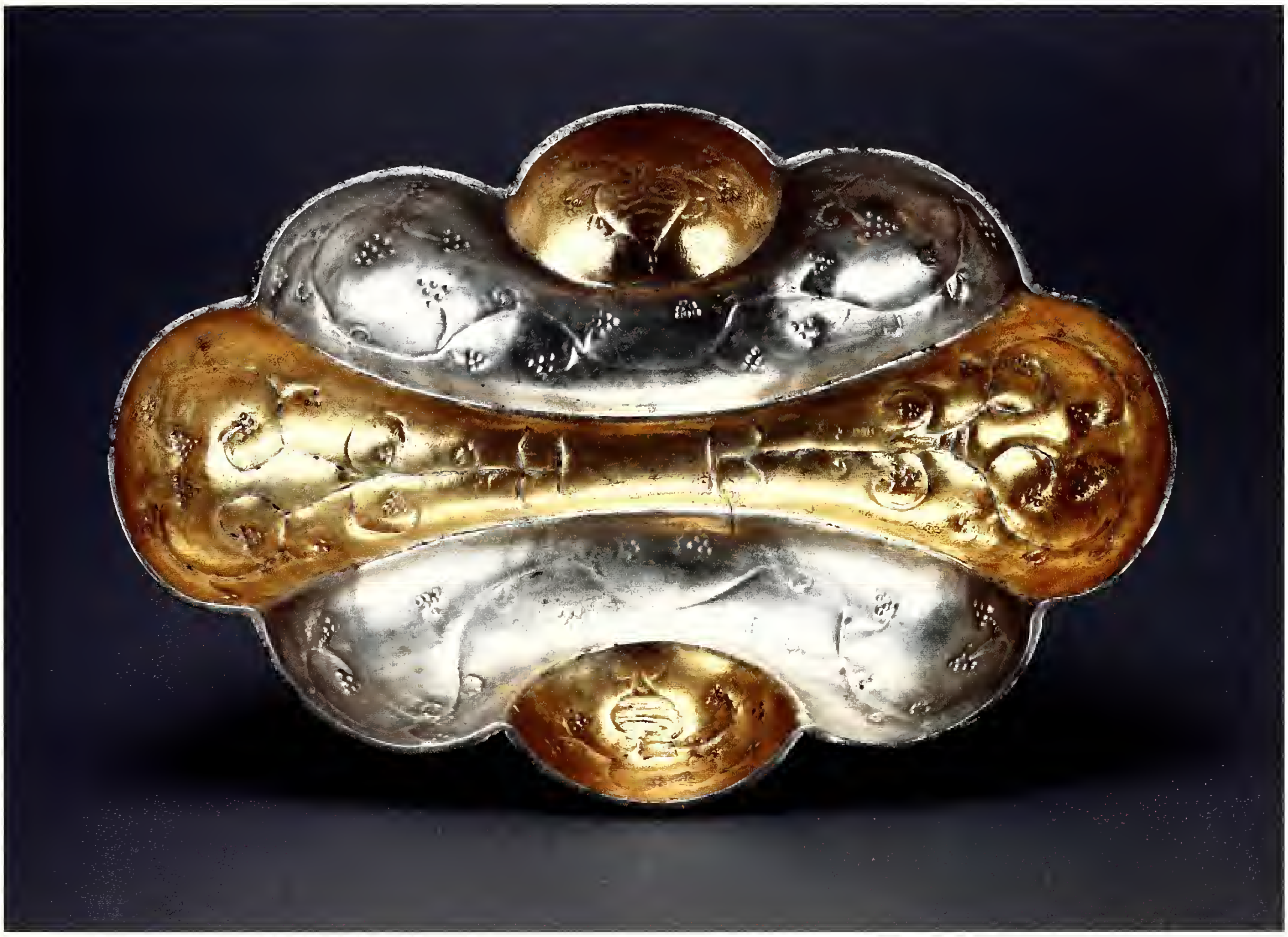
Shallow bowl or boss, 4th–5th century A.D., silver, gilt, and niello. Freer Gallery of Art [23]



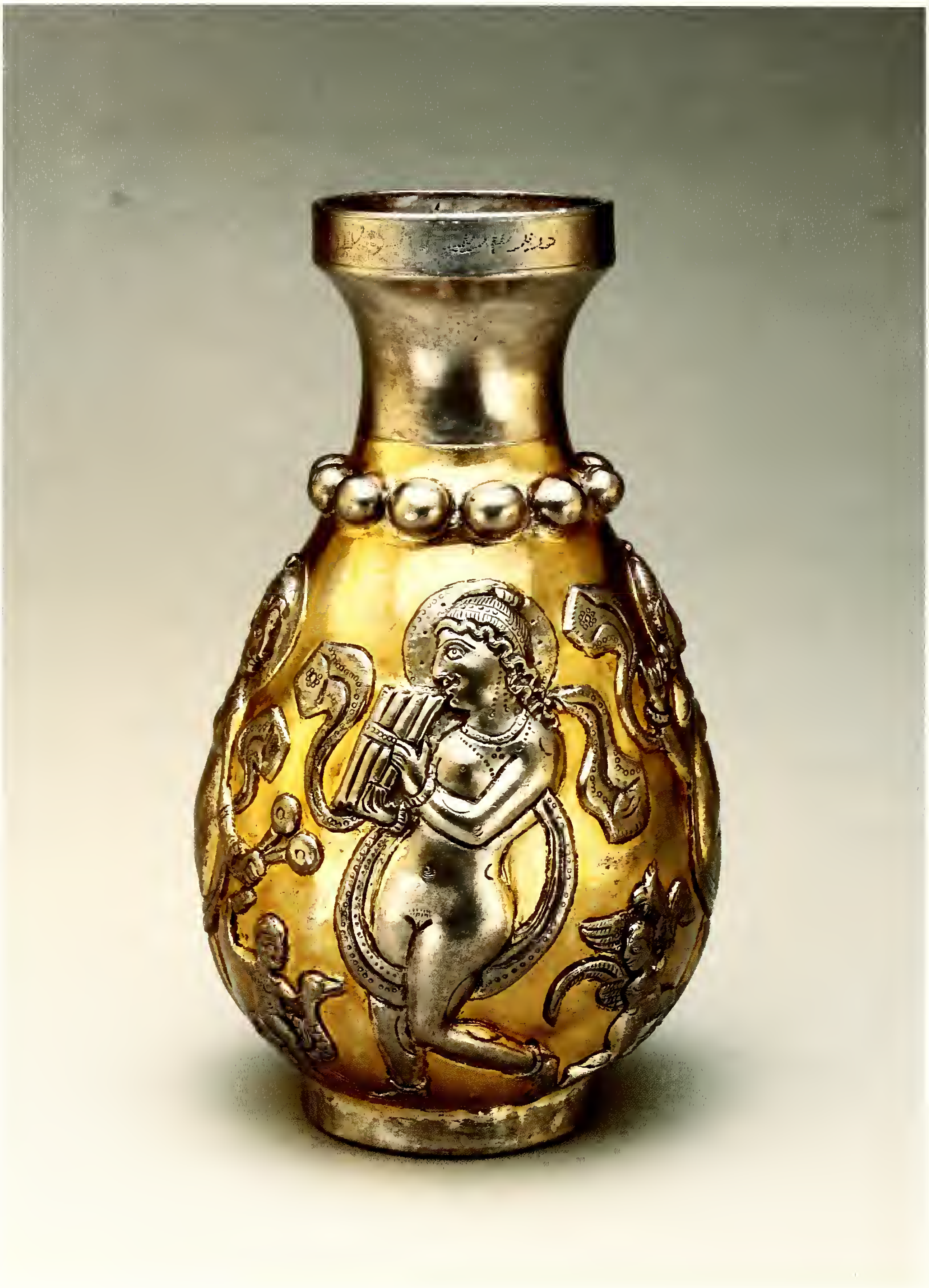
Bowl, 3d century A.D., silver and gilt. Freer Gallery of Art [24]



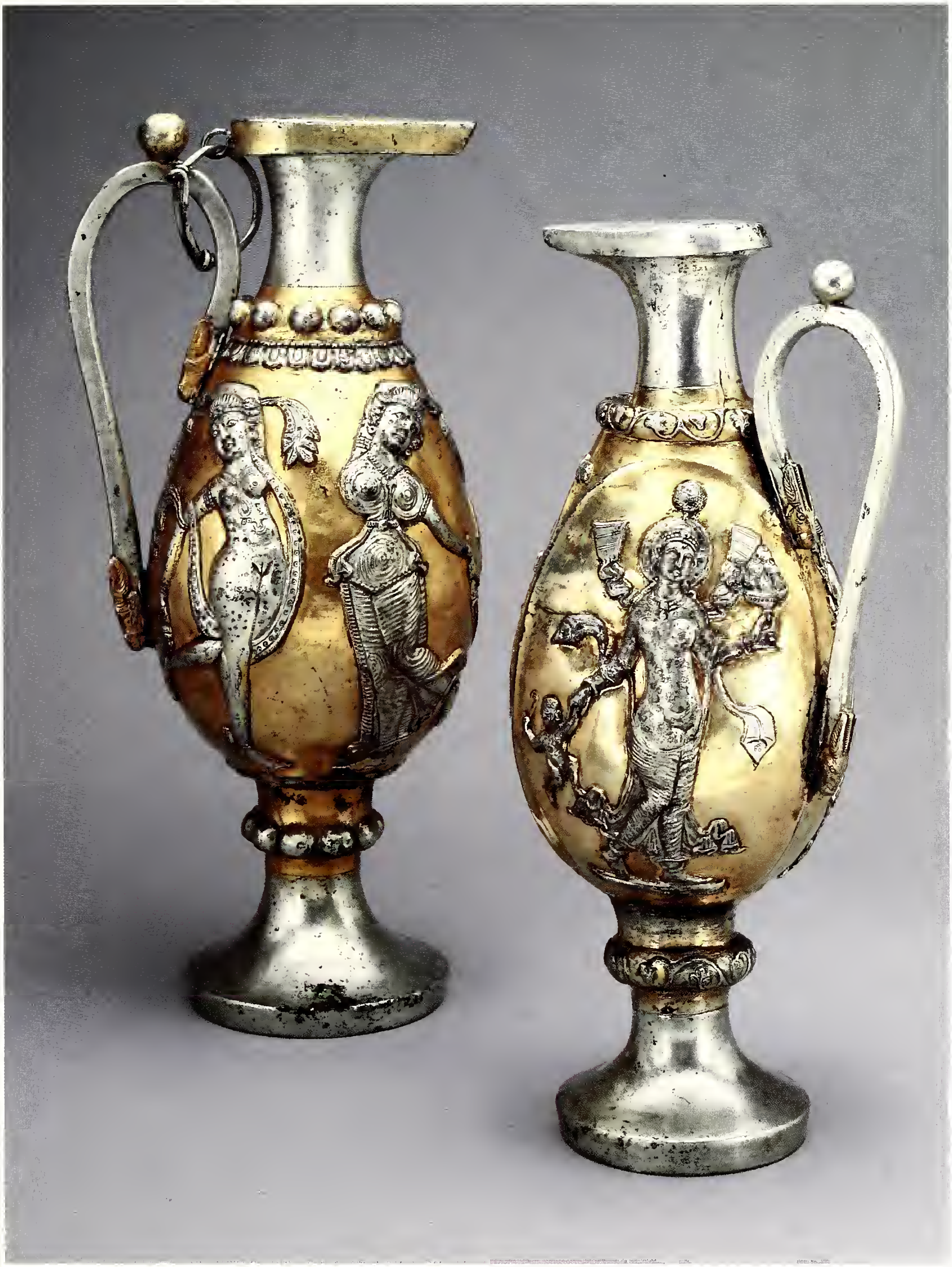
Bowl, 5th–7th century A.D., silver and niello. Arthur M. Sackler Gallery [26]



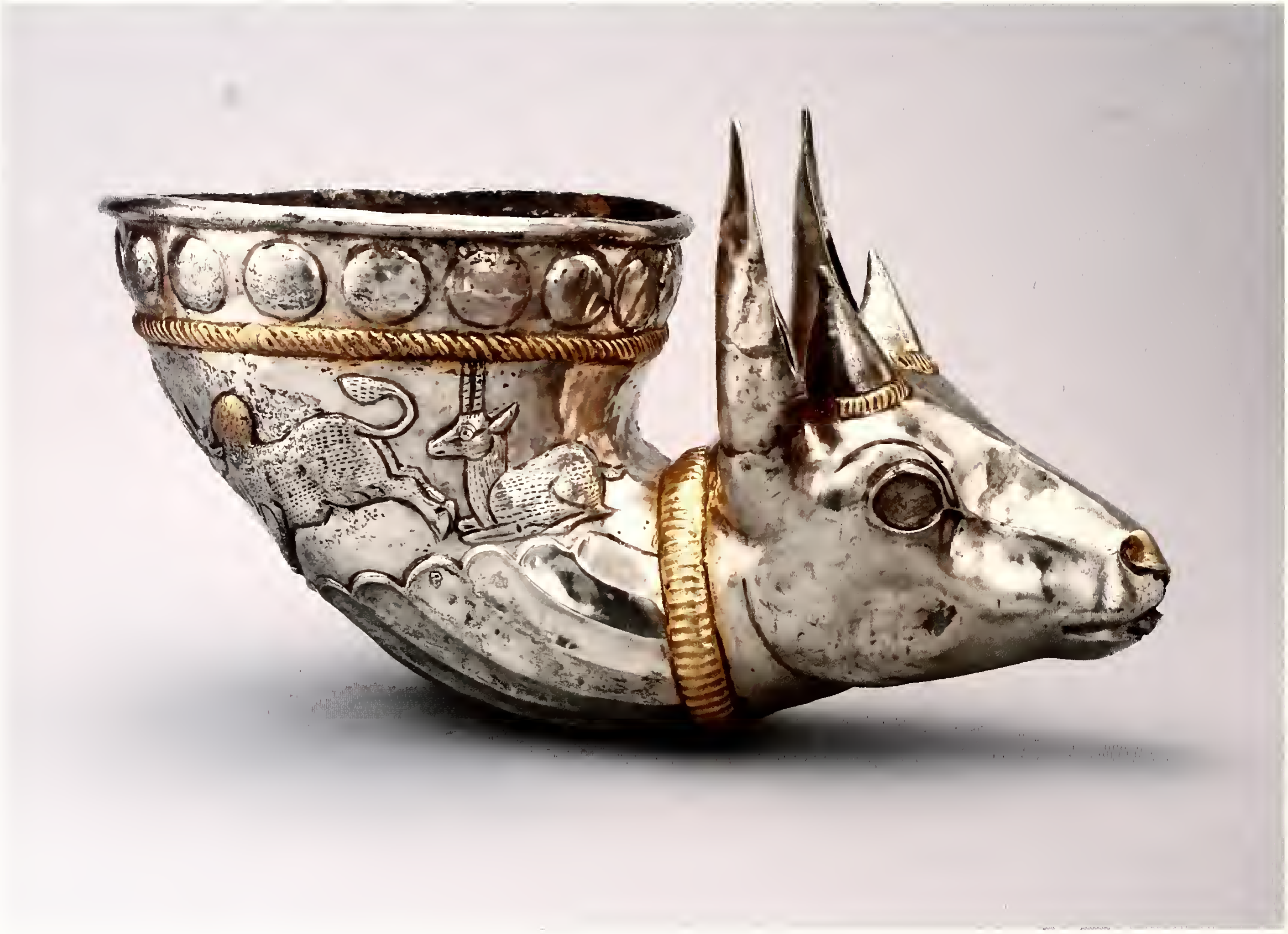
Lobed elliptical bowl, 7th century A.D., silver and gilt. Arthur M. Sackler Gallery [30]



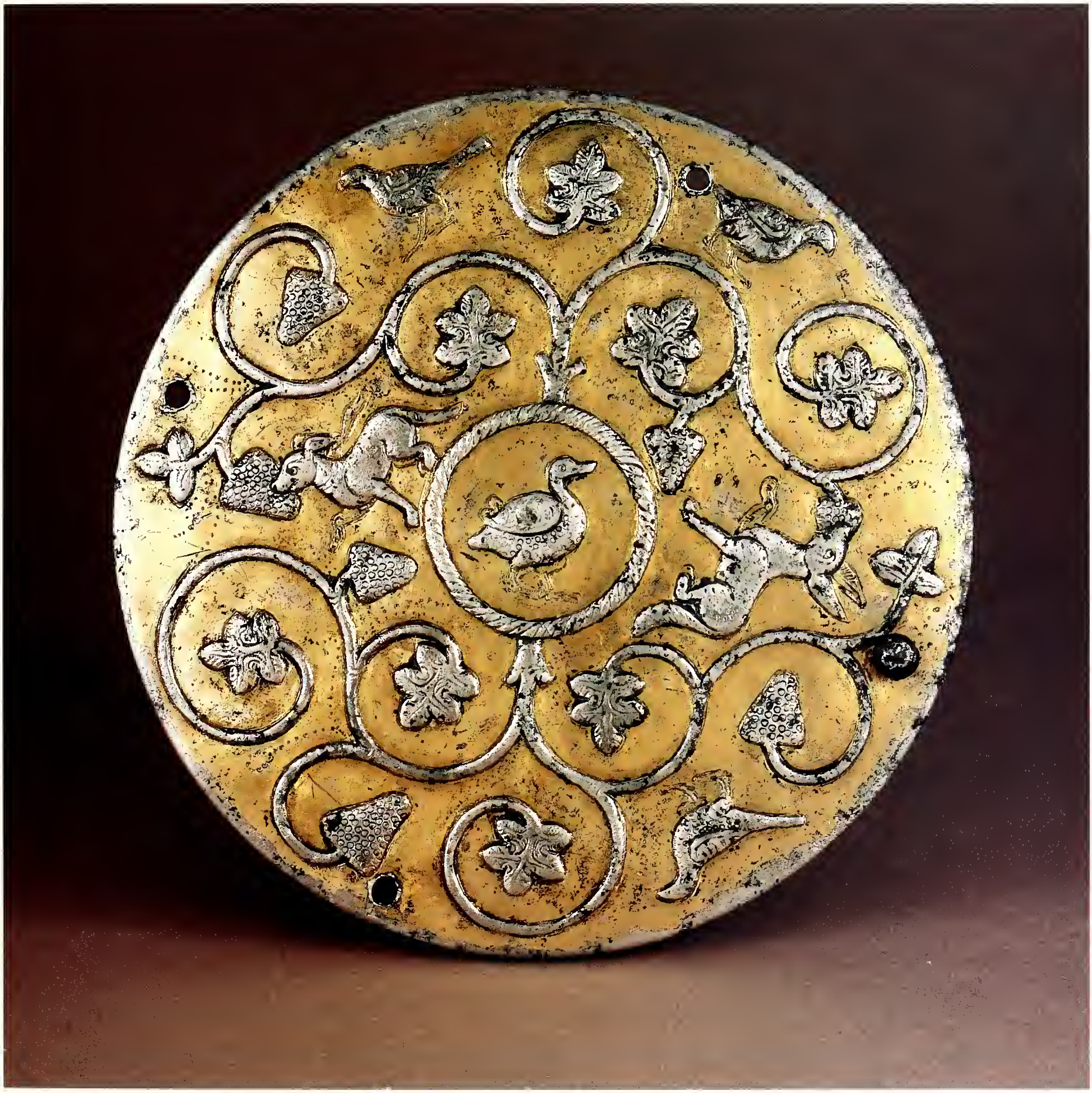
Vase, 6th–7th century A.D., silver and gilt. Freer Gallery of Art [34]



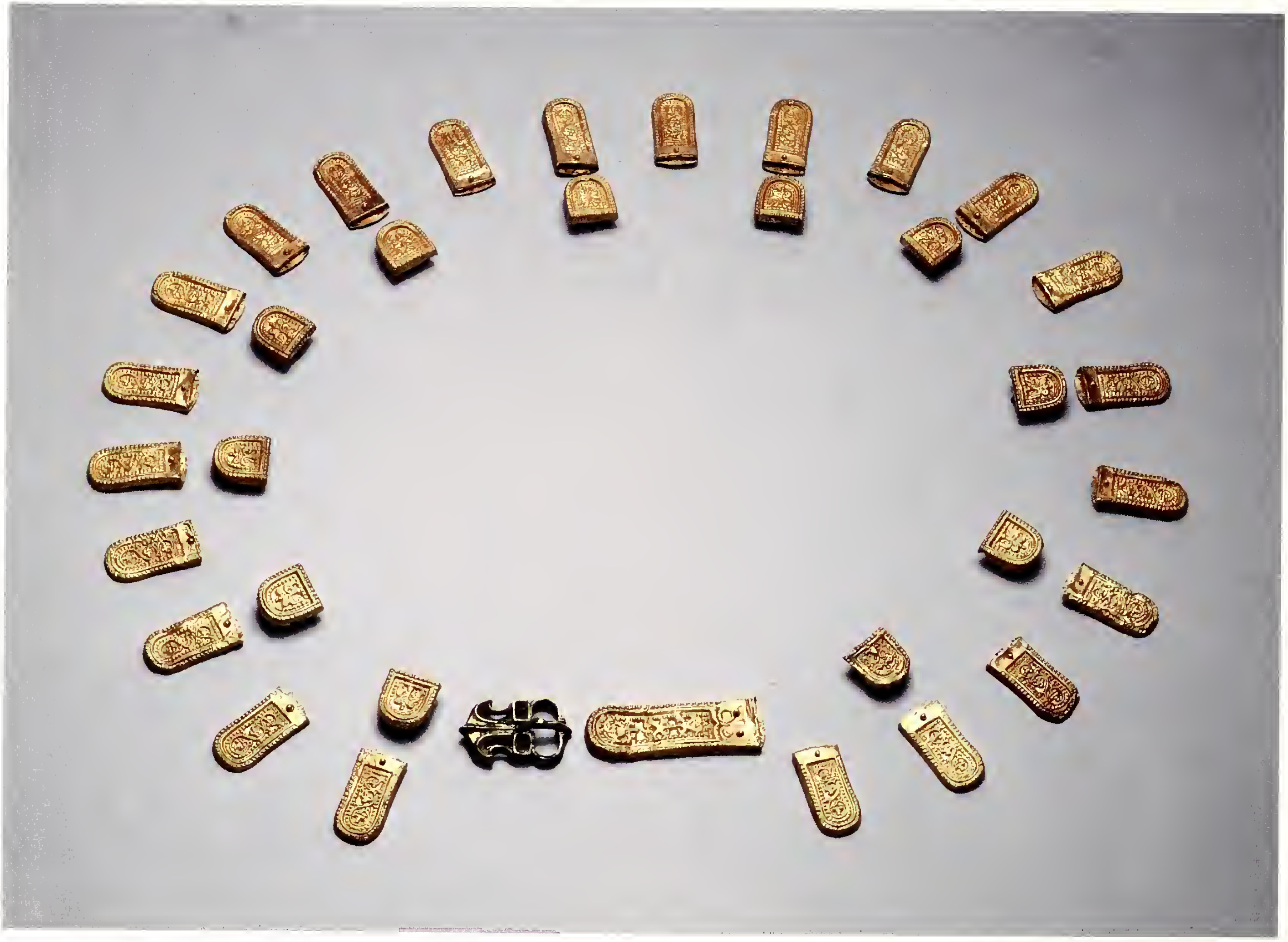
Ewers, 6th–7th century A.D., silver and gilt. Arthur M. Sackler Gallery [35, 36]



Horn rhyton, 4th century A.D., silver and gilt. Arthur M. Sackler Gallery [38]



Roundel, 6th–7th century A.D., silver and gilt. Arthur M. Sackler Gallery [39]



Belt buckle and lappet fittings, 7th century A.D., silver and gilt *(buckle)* and gold. Arthur M. Sackler Gallery [42]

# *Materials and Methods of Manufacture*

TECHNICAL INFORMATION about works of art is never a substitute for iconographic, stylistic, or art-historical study; it is an adjunct to that study. While scientific data, observations, and theories about manufacture and provenance based on the technical study of works of art can be extensive, none of this information is an unequivocal statement of truth about the physical nature and creation of artifacts. Technical studies of art are limited in what they can tell us about how an object was made. Yet for works of art from ancient cultures whose history is mostly lost, technical information, primarily inherent in the objects alone, assumes a greater importance in our knowledge about those works of art.

The technical discussions of objects catalogued in this volume have several goals. First and foremost of these is an account of the technical and physical features of each object, such as analyses of compositions, interpretations of radiographic images, or microscopic examinations of toolmarks. This information is intended to provide researchers in the field of Iranian metalwork with a fuller understanding of objects in the Freer and the Sackler Gallery collections and aid them in their studies. A second goal is to describe what sort of working methods might have been employed to result in the observed technical features. While a brief glossary of metalworking terms has been included, definitions alone do not convey a sense of the processes by which these objects came into being. For that reason, some working methods are more fully described in the following general discussions of bronze, silver, and gold. To some extent, these descriptions are hypothetical re-creations of how ancient metalworkers might have made the objects in question. Statements about working methods vary in their degree of surety. Some physical features—such as the dendritic microstructure of cast bronze—can only result from certain technical procedures. Judgments about other working methods are less certain and are based "on knowledge of modern metalsmithing techniques."[1] What little evidence we have of ancient metalworking methods of the period in question, other than the objects themselves, bears out this assumption. Among the most notable evidence are reliefs dating to the late fourth century B.C. from the tomb of Petosiris at Hermopolis, Egypt, that depict the manufacture of rhyta and other objects.[2] The tools and their method of use conform with traditional metalsmithing procedures. To some extent, however, this assumption may be misleading. Certain techniques found in Iranian metalwork, such as the carving of designs in silver, are not typical or traditional by modern standards. By attempting to discover and describe techniques such as these, a better understanding of the objects is achieved.

Judgments about the entire field of Iranian metalwork from the Achaemenid through the Sasanian periods based on the small and fortuitous gathering of objects in the collections of two museums are inappropriate. The number of works in the Freer and the Sackler Gallery collections attributed to the periods prior to the Sasanian dynasty is very small, and technical information about comparable works is largely unavailable. Conversely, while the holdings of Sasanian silver objects in the Freer and the Sackler are sizable, much more study has been done in this area. The work of Harper and Meyers has been noted previously, and most of the compositional data for the silver objects discussed in this catalogue is the work of Meyers, who has generously allowed the results to be quoted here. For these reasons, the compositional and technical data for the objects are presented with little interpretation. General comparisons with the findings of other laboratories on objects of similar provenance are given when the comparisons offer interesting parallels or suggest possible trends in the evolution of metalworking techniques.

One such trend was the consistent use of hammering techniques for forming objects. With the exception of added parts, all the objects described in this catalogue are believed to have been formed by hammering. Regardless of age and forming technique, certain technical features of metalwork are greatly dependent on the type of alloy used. The Iranian metalwork in the Freer and the Sackler Gallery collections can be divided into three groups according to their basic compositions of bronze, silver, or gold.

If metalwork is to be discussed on the basis of its composition, some attention must be given to how those compositions were determined. A summary of the analytical methods, tables of results, and a brief discussion of the accuracy of those results are provided in the Appendix. The analytical results for each object are also given in the individual entries.

## Bronze

Five works composed of bronze are catalogued here, four vessels and one handle in the shape of a panther [1, 2, 4, 8, 22]. These objects are descendants of a bronzeworking tradition in West Asia, which at the time of their making was millennia old. Mixtures of copper and other metals were among the first alloys to be developed, and the earliest examples of bronze, dating to the late fourth or third millennium B.C., are from the Near East.[3] Many pre-Islamic cultures are noted for their bronzes, with just one of many possible examples being Luristan. It seems surprising, therefore, that relatively little is known about the use of bronze from the Achaemenid through the Sasanian periods. Most bronzes from archaeological finds made in Iran and dating to this epoch are small, utilitarian objects. The few published analyses of bronzes attributed to this period suggest that, while some consistent patterns of alloy use can be ascertained, a number of alloys were employed. Bronzes considered to be of Sasanian origin are particularly few.

One type of bronze alloy attributed to the Sasanian and early Islamic periods and often used for vessels was high-tin bronze, which has a tin content around 20 percent.[4] Differences in the tin content of bronzes have a marked effect on how they may be worked. Bronzes with a tin content of less than 5 percent can be worked cold, while those with a tin content greater than 16 percent are most easily worked hot. Changes in the crystal structure of high-tin bronzes make them brittle at temperatures lower than 560 degrees Centigrade unless they are rapidly cooled (quenched) from a temperature higher than 560 degrees. Quenching will make a high-tin bronze somewhat malleable at room temperature but not to the extent that it can be worked at high temperatures.

Although most published discussions on wrought high-tin bronze vessels have focused on those works attributed to the Sasanian and early Islamic periods, such vessels were also produced during other periods.[5] The examination of three bronze bowls [1, 2, 22], two of which are believed to date from the Achaemenid period, supports that opinion. All the bronzes have relatively high tin contents, ranging from 15 to 28 percent.

Why was a complicated technique such as hot-forging used? A wrought bowl is lighter and thinner than one formed by casting, but a low-tin bronze can be raised also. It may be due to the color of the metal, which would be silvery and thus appear more like work in silver. High-tin bronze has a light golden color when the tin content is around 20 percent, and the color becomes more silvery as the tin content is further increased. Wrought high-tin bronzes also have a musical quality and have been used for cymbals and gongs in many parts of the world.[6] Another possible reason for the use of this alloy is that it is easily patinated to give a lustrous black surface color. No direct evidence supports a contention that bronzes were deliberately given black patinas in the ancient Near East, and in a few cases black patinas on high-tin bronzes seem to have been the result of natural occurrences.[7] Yet high-tin bronze was used widely in China during the dynasties contemporary with the Achaemenid, Parthian, and Sasanian periods, and many bronzes bear alternating black and unpatinated areas, strongly suggesting intentional coloristic effects.[8] Conversely, high-tin bronze may not have been intentionally patinated, but rather, the naturally occurring black color was acceptable and even desirable as once a high-tin bronze turned black, it would be visually indistinguishable from tarnished silver. The black patina is further notable for its highly corrosion-resistant nature. Any number of these qualities may have contributed to the appreciation of vessels composed of high-tin bronze. An extremely well-preserved bowl with a black patina of this type is illustrated here [1].

The handle in the shape of a panther [8] is similar to the bowls in its high tin content but differs in that it contains a significant amount of lead (7 percent) and was formed by casting rather than hammering. Ancient metalworkers knew of the advantages of adding lead to bronze used for casting. Lead lowers the temperature needed to melt bronze and increases the fluidity of molten bronze, thereby helping achieve sharper detail in the casting. Lead in amounts greater than a few percent, however, adversely affects the ability of bronze to be shaped by hammering. An example of the sophistication of the metalworkers in this respect is a jug in the Sackler Gallery collection [4]. The body and handle have roughly the same tin content, around 10 percent, but quite different lead contents, with the handle containing a large amount of lead, 19 percent, and the body 0.2 percent. The body was hammered and the handle was cast.

## Silver

Thirty-seven objects composed of silver make up about 80 percent of the pieces discussed in this catalogue. Most are attributed to the Sasanian dynasty. While the works in silver from the Achaemenid through the Sasanian periods were formed by the same basic methods, which employed hammering techniques, changes occurred over time in the decorative techniques employed, such as the type of gilding used. Another apparent trend is that the types of decorative techniques employed on individual pieces were limited in the earlier pre-Sasanian periods and then again in the late Sasanian period, while during the early and mid-Sasanian period a greater variety of methods was employed for each piece. Thus the Achaemenid and Parthian vessels, including the elaborate forms of the rhyta, are executed with a minimum of techniques. In contrast are the royal hunting plates of early and mid-Sasanian date, such as the Freer Shapur plate [13], for which the decorative techniques employed include carving, engraving, chasing, repoussé, casting, crimping, and gilding. Toward the end of the Sasanian era, the use of fewer decorative techniques for any one object is again favored.

Another possible trend is that the works from the earlier Achaemenid and Parthian periods are composed of somewhat purer silver, with the alloys often having a silver content of 97 percent or more. Published analyses of works from other collections report similar results.[9] The silver contents of the Sasanian period objects are generally lower, with the bodies of the vessels often containing around 92 to 94 percent silver. This silver content is close to what is known today as sterling silver, which is 92.5 percent silver.[10]

While many of the same working techniques used in Iranian silverwork are employed repeatedly, their method of application can vary greatly. For a fuller understanding of the objects, it is useful to consider how various types of vessels were constructed.

## *Rhyta*

The three Parthian rhyta discussed in this catalogue are fine examples of works formed by raising [9–11]. Rhyta consist of three basic parts—horn, protome, and ring. The ring covers the juncture of the other two parts ([10] has lost its ring). The legs of the animal protomes are separate parts, formed by either casting or hammering, which were then attached to the bodies. Generally the walls of the horns are thick in cross section, compared to the extremely thin protomes. Chasing was used extensively to refine the forms of the protomes and add decorative details; low-relief decorations, formed by hammering and detailed by chasing, are found on the horns of two rhyta [9, 10] but not on a third [11]. Leaf gilding was used to accentuate details or, in the case of [11], to cover entire parts of the vessel like the rim and protome.

## *Bowls and Plates*

The forming of the bodies of bowls and plates began with a single circular sheet of silver. Hammering was used to achieve the basic form and probably comprised both raising, where the sheet is worked on what becomes the outer surface, and sinking, where the sheet is worked on what becomes the inner surface. A rim thickened on the inside edge is common in Iranian silver plate, and it seems that this form would have been most easily accomplished by first using sinking to stretch the interior of the sheet down and leave the edge of the circular sheet thick. Once the rim was basically formed, raising, by working over a stake, would then be employed to refine the shape of the vessel.

The bowls and phialae attributed to the periods predating the Sasanian Empire bear simple decorations, if any. The lobes of the Achaemenid phiale [3] and Parthian bowl [5] were chased around their perimeters to sharpen the forms. Engraving and leaf gilding were used for the decorations on the other Parthian bowl [6] and the bowl attributed to the Seleucid period [7].

Bowls and plates of the Sasanian period were basically formed in the same way but were much more elaborately decorated. For those vessels bearing low-relief decorations on the interior surface, repoussé techniques may have been used to slightly raise the design areas, which were later completed by carving, or the low-relief designs may have been entirely carved. Repoussé decorations are clearly seen on the thin-walled dishes of the later Sasanian period, where a mirror image of the raised design on the interior is found

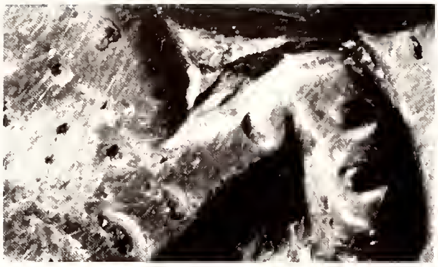


Fig. 1. Photomicrograph of the raised area within the carved background of relief decoration [see 39].

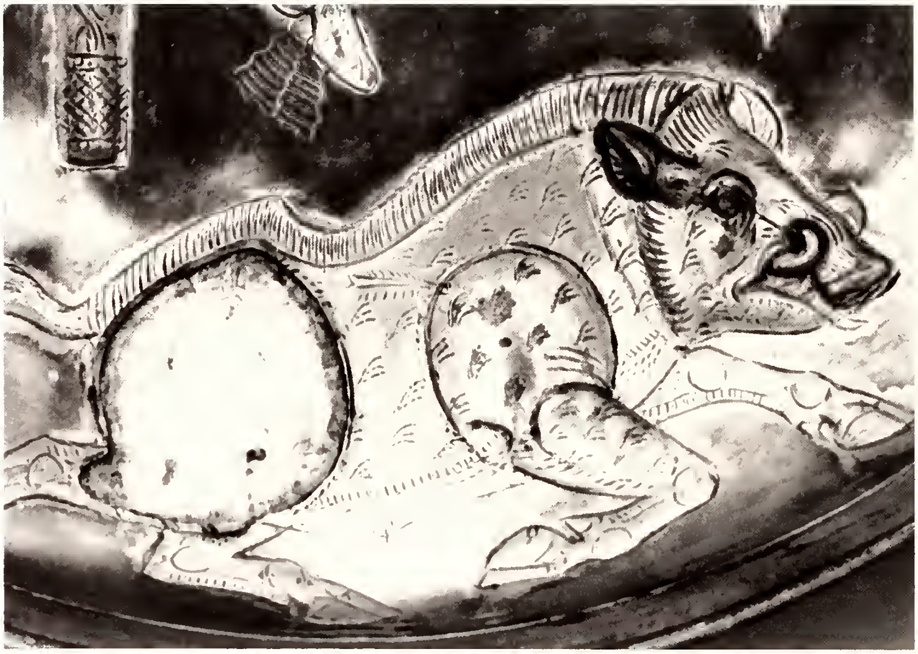


Fig. 2. Boar figure for which the added element for the haunch has been lost and the beveled, undercut background is revealed [see 13].

recessed on the exterior. With thick-bodied vessels, raised decorations can also be formed on the interior surface by using repoussé on the exterior surface. The exterior surface can then be smoothed by carving or finished by turning, leaving an undecorated surface, or carved to give a different decoration than that on the exterior. Among the objects from the Freer and the Sackler Gallery collections are a number of examples of this use of raised decoration on the interior surface in combination with exterior surfaces that are smooth or bear carved decoration. Many works in other collections display the same features.[11] This technique is most obvious on vessels that have raised bosses on the interior surface and a smooth or carved exterior surface.

Carving is not a technique common to modern or traditional silversmithing but was frequently used by the metalsmiths of the Sasanian Empire and other contemporary cultures. The visual and microscopic features of this technique, however, are elusive. One common trait is often seen in sections of raised designs in which a narrow background space was created; here the background is difficult to cut away and frequently has raised areas with sloping sides (fig. 1).

Annular or banded finishing marks are common on plates with smooth exteriors [13]. On both sides of one plate in the Sackler collection [15] are strongly delineated annular striations. Such marks can be interpreted as indicating the use of a lathe or some type of rotary-motion machine, and typically this interpretation is extrapolated to mean that turning or spinning was employed in the forming process. Spinning, however, was not used as a forming method until much later in history, and radiography shows that the forms were created by hammering. It seems doubtful that turning was typically used

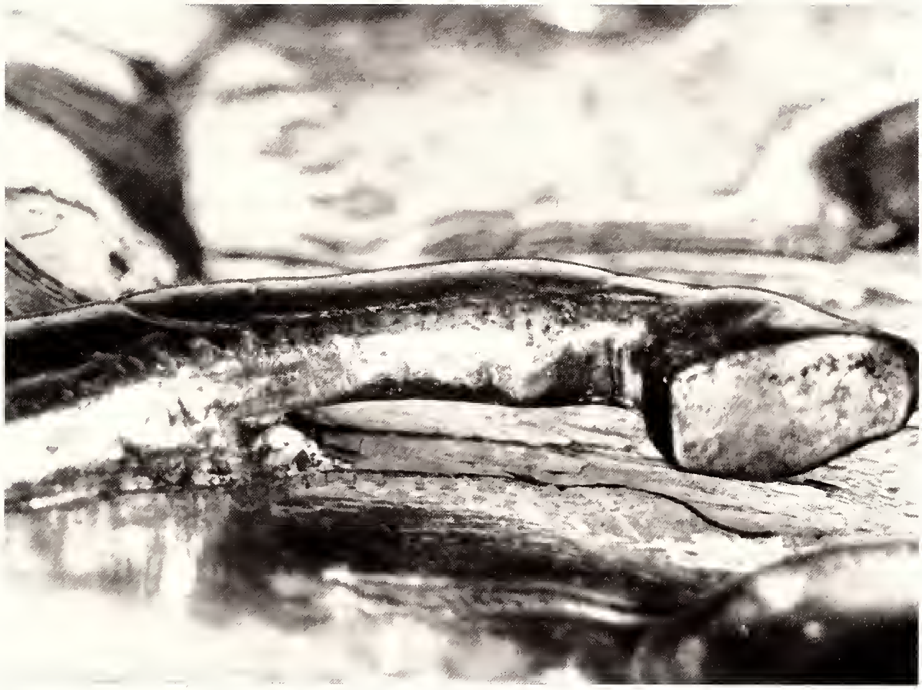


Fig. 3. Macrophotograph of the leg of a horse raised entirely above the background [see 14].

either, although the annular striations on [15] suggest that it may be an exception and was turned in the course of its shaping. At the very least, the perfect circularity of the annular striations seen on many plates suggests the use of rotary-motion devices to assist in the polishing process. These striations and the various metalworking techniques that might have been used to produce them have yet to be explained adequately.

"Crimping" is a term used to describe the process by which high-relief decorative elements, formed by either hammering or casting, are affixed to the body of a plate (fig. 2). The outlines of the elements to be added were beveled and undercut in the plate. Following this the elements were set in and the lips pressed down over the edges. Chasing with punches over the junctures secured the inset pieces and helped hide the seams. Crimping shares many features with certain types of inset decorations but differs in that the added elements stand well above the surrounding surface and may even be detached from the surface except for a single point of juncture (fig. 3).

Both chasing and engraving were used to define and model decorative details on bowls and plates; chasing alone is typical for thin-walled vessels, while both techniques are common on thick-bodied plates. The engraved outlines of figures, as seen on the royal hunting plates [13–15], were typically executed with a V-shaped gravure and beveled so that the resulting recessed groove has one side perpendicular to the surface while the other side slopes at a low angle. Tooling along the outlines of raised decorations not only defines the shapes but also, in an illusory manner, makes the difference in height between the raised and recessed areas appear greater.

One of the last steps in making bowls and plates was the addition of feet. Those most frequently found on Sasanian plates were simply formed from strips of metal bent into circular bands, with the ends joined using a scarf joint. On some vessels the feet appear seamless and may have been formed by hammering a ring or an annular band of metal into the necessary shape. The usual method of attachment was by soldering, although in a few cases some method of mechanical joining may also have been used [16].

The gilding used for Sasanian silver vessels was rarely anything but amalgam gilding. The only exception found among published technical studies is the leaf gilded horse rhyton in the collection of the Cleveland Museum of Art. Also one of the bowls dated to the Sasanian period may bear leaf gilding [31].

### *Vases and Ewers*

The vases and ewers of the late Sasanian period are excellent examples of the use of raising, repoussé, and chasing [32–37]. Although all the metalwork discussed in this catalogue was formed by hammering techniques, none surpasses these vessels in quality of execution. Each vase and ewer body, with the exception of the handles and the feet of the ewers, was created from a single sheet of metal. Radiographic, metallographic, and microscopic examinations confirm that the bodies of the vessels consist of one sheet of metal formed by hammering. To understand just how the vessels were made, it may be useful to picture their creation step-by-step.

The smith would begin working a sheet of metal at its center to create the rounded base of the body. On the vases he would raise the low, circular foot. On reaching the widest point of the body the smith would begin narrowing the body, closing in the metal to create the neck and spout. Continuing with a different stake extending into the body, he would hammer and compress the metal to form the decreasing diameter of the body and neck. He would finish by forming the lip or spout. Once the form was created the smith would then smooth and perfect the surface of the vessel. Throughout the process he would repeatedly anneal the vessel to relieve the strain in the metal caused by hammering.

One would expect that this method would cause the metal to be thickest in the narrow areas of the neck and spout. There the metal would have built up when compressed to form the sections of smaller diameter. Radiographic examination shows that the metal is least thick in the areas of the body having the widest diameter and raised decoration. Contrary to expectations, however, the necks and spouts of the vessels generally are not much thicker than the upper portions of the body. This anomaly may be explained by the toolmarks present on the inner surfaces of the necks and spouts. The irregular gouges and facets suggest that the metal has been thinned down through scraping or

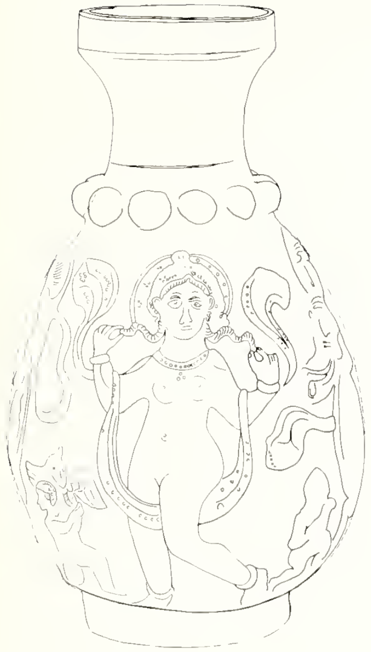


Fig. 4. Drawing illustrating the profile of a vase before the raised and repoussé decoration is created [see 34].

carving, possibly to lighten the weight carried by the walls of the body.

Only after completing the form of the vessel could the metalsmith create the raised decoration. Repoussé was used, but not in the limited sense of the word commonly employed to describe the raised decorations created by hammering from the back surface of a piece of metal. Repoussé can also refer to the method whereby raised decoration is created by working on the front of an object and the background is sunk.[12] Examination of the vases and ewers described here and in other collections reveals that the high points of the raised decoration, with the exception of the raised bands between the necks and bodies, all lie in the same plane while the recessed backgrounds do not (fig. 4). It is for this reason that the decorations on the bodies appear to have been mainly created by working on the outside of the vessels and sinking the background. For the task of raising the decorative bands separating the necks from the bodies, repoussé using a metalsmithing tool such as a snarling iron to push the metal out from the inside surface is the only method that seems applicable. When the secured end of a snarling iron is struck, the free end, which is situated inside the vessel, vibrates with enough force to raise the metal from the inside.

Once the form of the decoration was complete, the smith would continue to work the metal from the outer surface. By additional hammering and burnishing, he could smooth out the recessed surfaces. The raised areas of decoration would be better defined by chasing along their outlines with a small punch. Chasing was also employed to create decorative details. A limited number of punches was typically used, with many decorations made with a ring punch or small dome punch.

The feet of the ewers—formed by hammering—and the handles were soldered to the bodies. It is not clear whether the handles were cast or hammered, although hammering seems the most logical mode for two reasons. Not only would the handles be the simplest part to form by hammering but also the thumb rests of the handles appear in all cases to have been soldered to the main part of the handles. If the handles were formed by casting, it would have been logical to cast them in one piece rather than join two separate pieces.

Amalgam gilding was used in all cases, as is commonly found on Sasanian silverwork. Once polished and gilded, the vases would be complete. On the ewer the additional parts would be formed and attached before gilding.

## Gold

Six works of gold are presented in this catalogue [12, 41–44]. All employ relatively pure gold alloys (with the exception of the backplates of some pieces) and were basically hammered from gold sheet. Chasing and tracing were used to refine forms and details. Four objects include the use of wire decoration

[12, 41, 43] and one, granulation [41].

In many ways the technical examination of gold objects to determine their authenticity can be more difficult than with objects composed of other metals, and it seems that the judgments rely on more subjective criteria. Compositional analyses of incontestably ancient gold objects from Iran are relatively few, and so little comparative material is available. An understandable reluctance to remove samples from gold objects further limits the analytical methods that can be used, and the number of elements that can be identified and quantified is, therefore, also limited.

With few exceptions, the basic techniques of working gold remained fairly consistent throughout antiquity and up to the modern era. As with compositional analyses, the understanding of technical traits and trends is lacking due to the limited study of and access to undoubtedly ancient artifacts. Also the resistance of gold to corrosion processes prevents changes that are found with ancient silver or bronze objects, although corrosion effects on the baser elements of gold alloys are sometimes apparent. Thus the technical traits most often used to determine the antiquity of unprovenanced gold artifacts include the examination of surface features such as wear, damage, encrustations, and patina; obvious anomalies in technique; and evidence of intentional antiquing of the surface by acid-etching or anomalous abrasion.

It is rare for an ancient object to have weathered the effects of time in a uniform fashion. Dents in a gold object, for example, must logically follow from some cause; if dents on a gold piece are found in a number of separate areas and of similar severity then they must be explained as due to individual accidents that were similar in effect or they occurred at the same time from the same cause. The former is highly unlikely; the latter suggests intentional damage and thus the work of a forger. Also, accidental wear should correspond with the shape of an object and its possible use. Signs of natural wear are often seen in recesses as well as on high points; artificial wear seems concentrated on high points while the recesses remain unscathed. The nature of an alloy and its often natural inhomogeneities, the shape of the object, the changing environment in which the object has existed over time, cleaning and recorrosion, all determine the corrosion products present on an artifact and contribute to the formation of an inhomogeneous surface condition. When corrosion effects are uniform over the surface of a supposedly ancient object composed of silver or gold, it is often difficult to explain the effect as a natural event, except when corrosion is quite extensive. Ancient gold alloys often bear a patina caused by the oxidization of copper and silver constituents, which slightly discolors the surface. A rather matte appearance can occur, and objects that have been buried for long periods of time may bear earth encrustations. Wear and scratches are also sometimes, rather loosely, considered attributes of a patina.

Problems arise in distinguishing the surface attributes of ancient gold objects that have been repolished extensively or cleaned with acids. The resulting etching and scratching disfigure the aged surface. Evidence of naturally aged surfaces is usually still present, but in a few cases for which etching has been excessive, surface features that may testify to the antiquity of an object can be almost totally obliterated. Further, the etching of gold to give the appearance of age is a common practice of the forger.

All these considerations come into play in the examination of gold objects. Three works attributed to the Achaemenid period were found lacking in those technical characteristics commonly ascribed to gold artifacts of that era [43, 44].

## Gilding

Although just one of many decorative techniques used in Iranian metalwork, gilding has distinctive features that make it worthy of particular consideration and it is its application to silver that is most noteworthy. While the surfaces of two of the bronzes surveyed in the catalogue were flecked with gold [2, 4], these minute traces allow for little speculation about whether or how gilding was employed. In fact, the presence of gold on these objects may be due to accidental contact with other gilded vessels in a burial context, although this seems less likely for the bronze jug [4].

A summary of the silver-gilt objects described in this catalogue is as follows: Five of the seven silver vessels attributed to the Achaemenid, Seleucid, and Parthian periods are leaf gilded [6, 7, 9–11]. Loose, sharp edges of gold leaf can be clearly seen in microscopic examination. Also, X-ray fluorescence analyses of the vessels and electron-microprobe analysis of one sample do not indicate the presence of mercury. Thus, the gold leaf was most likely attached to these vessels using mechanical methods or by mechanical pressure while the metal was heated.

Of the Sasanian silver objects described here, only one bowl was clearly originally ungilded [26]. Gilding was not found on one other vessel, but the other decorative features of the vessel suggest that it once would have been gilded [19]. Where gilding was found on those silver objects believed to be of Sasanian origin, the type of gilding used was amalgam gilding (also known as fire gilding); this is with the exception of one bowl [31], where leaf gilding appears to have been employed. Why this bowl would be different in this respect is inexplicable.

With the one exception noted above, the gilding found on the silver objects in the Freer and the Sackler Gallery collections corresponds with what other researchers have found.[13] The use of gold foil on Achaemenid and earlier silver has been documented.[14] A Parthian silver bowl in the collection of the British Museum, London, was found to have been gilded with leaf and without the use of mercury.[15] The use of amalgam gilding on Sasanian silver is confirmed by numerous examples.[16] One somewhat anomalous case is the horse rhyton in the collection of the Cleveland Museum of Art; this early Sasanian vessel was gilded with gold leaf adhered using mercury.[17] The use of mercury to affix gold leaf is not common in Sasanian pieces but is frequently found on Byzantine silver.[18]

These various studies of gilding on Iranian silver suggest an evolutionary trend in gilding methods from the Achaemenid period through the Sasanian period. Gold foil appears to have been commonly used in the Achaemenid period and earlier. Parthian silver exhibits the use of thinner sheets of gold, that is, gold leaf rather than the somewhat thicker gold foil. The study of Parthian period works also has not shown any use of mercury in the gilding process. By early in the Sasanian period the use of amalgam gilding had clearly become the dominant gilding technique. It is interesting to speculate whether the Cleveland rhyton represents an intermediate step at the beginning of the Sasanian period between the use of leaf gilding without mercury and amalgam gilding or whether this feature indicates a Byzantine influence in the making of this particular vessel and is not related to the general evolution of gilding techniques in Iran at that time.

## Notes

1. Harper and Meyers 1981, 147.

2. Muscarella 1980, pls. VIII–IX; Lefebvre 1924, chap. 5.

3. Moorey 1971, 285.

4. Muscarella 1988, 298; Harper 1988a.

5. Goodway and Conklin 1987.

6. Goodway and Conklin 1987.

7. Meeks 1990.

8. Chase and Franklin 1979.

9. Hughes 1984; Oddy and Meeks 1978; Hughes 1986.

10. Harper and Meyers 1981; Hughes and Hall 1979.

11. One of the best examples is an elliptical bowl in the collection of the Metropolitan Museum of Art, New York, where the punch marks on the exterior surface used to raise the bosses on the interior surface have not been entirely carved away: Harper 1988a, 333 n. 8, item e, with bibliography.

12. Untract 1968, 93.

13. Lins and Oddy 1975.

14. Oddy, Padley, and Meeks 1979; Moorey 1988.

15. Oddy and Meeks 1978.

16. Lechtman 1971; Harper and Meyers 1981.

17. Lechtman 1971, 4, 28.

18. Lechtman 1971, 6–7; Mango 1986.

# Catalogue

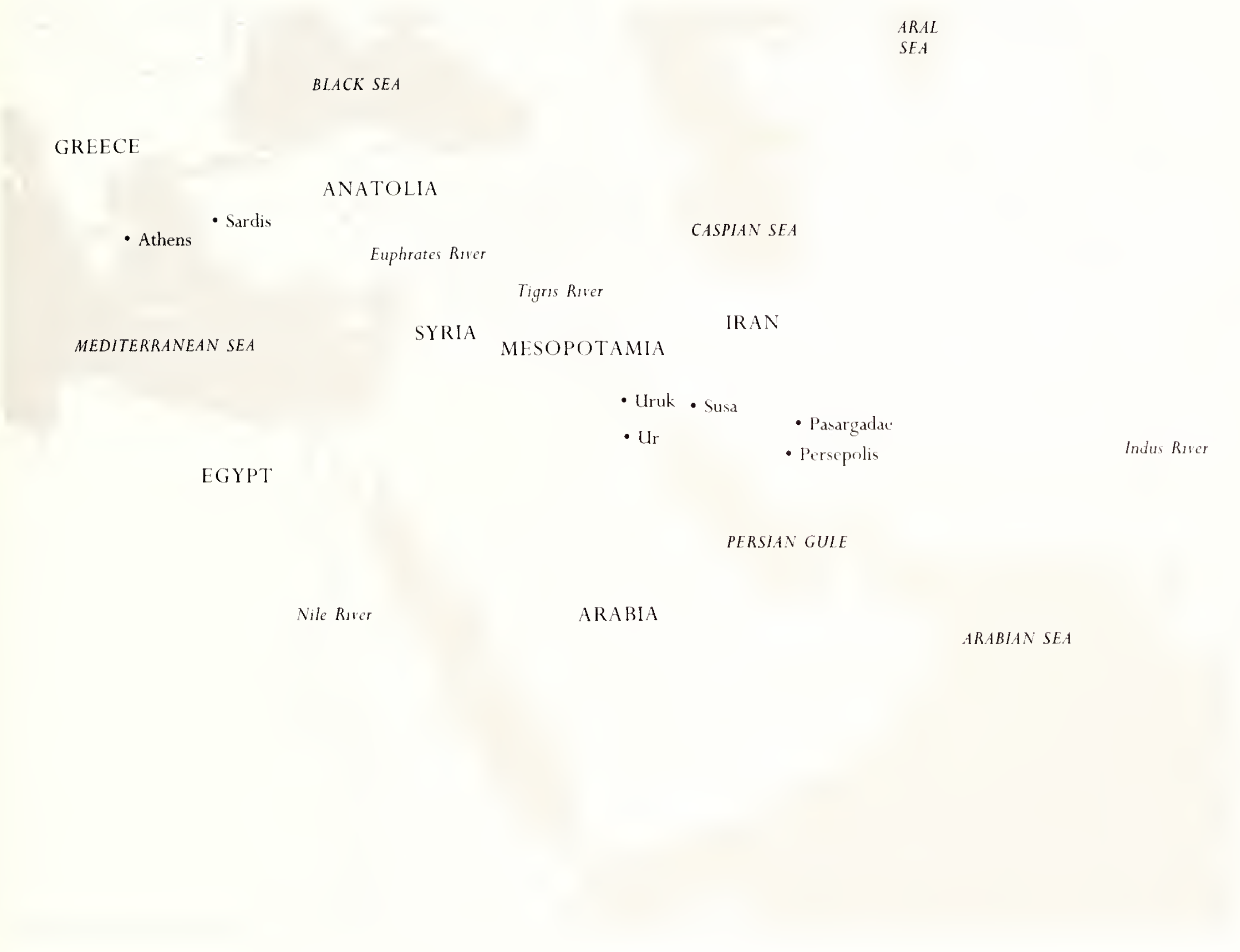
THE ENTRIES ARE GROUPED chronologically in three sections according to major historical periods. Within each period, the sequence proceeds from vessels of open to closed form, following the arrangement in the essay on shapes and decoration (pp. 23–31). Objects other than vessels are discussed at the end of each section.

Each entry consists of two parts. A description and art-historical discussion, including exhibition and publication history, relate the Freer and the Sackler objects to works in other collections or to broader artistic or cultural patterns. Whenever possible, reference is made to comparable objects recovered from controlled excavations. A second part, devoted to technical aspects of the works, describes the condition of the objects and their known restoration history. It also provides detailed information on the physical features and methods of manufacture of each object. A neat separation between these two parts is neither intended nor desirable, however; aspects of form, style, subject, date, and technique of manufacture or decoration are often addressed by both authors.

Suspected forgeries are grouped separately at the end of the catalogue.

# *Achaemenid Period*

## *Circa 550–331 B.C.*



# 1

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## *Phiale*

5th–4th century B.C.
Bronze: hammered, chased
Height 5.4 cm
Rim diameter 17 cm
Weight 242 g

Arthur M. Sackler Gallery, S1987.73
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1988, 28, fig. 10.

THE WALLS OF this shallow hemispherical bowl rise to a plain, slightly outturned rim; the base is gently flattened. A pattern of eleven radiating petals, each defined by a raised outer band, decorates the interior. A double set of radiating petals, with a lower and less prominent raised border, encircles the omphalos.

Wide, shallow, and footless metal bowls with a central omphalos are frequently described by the term "phialae." They form a large category of vessels produced throughout West Asia and the Mediterranean coastlands during the early first millennium B.C. Most are made of bronze. A number of subgroups have been identified on the basis of shape and decoration, perhaps corresponding to chronological developments and regional styles.[1] This type of drinking vessel, frequently decorated with patterns of radiating petals, was a favored shape of the Achaemenid period [see 2, 3].

The flattened treatment of the vessel's petal decoration is unusual. The leaf-shaped form of the petals may be compared with that on a silver vessel of Parthian date also in the Sackler Gallery collection [5]. Both vessels were allegedly found in Iran.

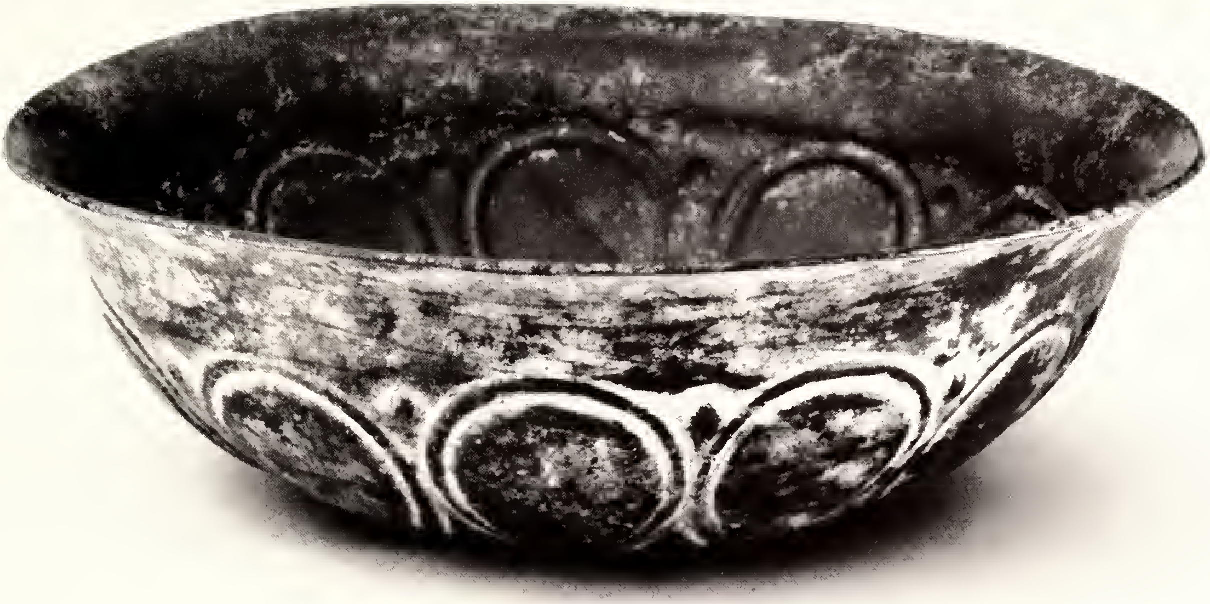
### Technical Discussion

The phiale was formed by raising. Radiographs of the vessel show that the metal varies in density in regular annular patterns. These patterns suggest "raising courses," that is, the changes in the density of the metal that occurred as the smith hammered around the circumference of the vessel.

The thickness of the wall of the bowl is roughly 1.25 millimeters around the rim and between 0.75 and 1.0 millimeters at the lobes; the center is appreciably thicker. Cracks are present where the metal is extremely thin.

A high-tin bronze containing a small amount of lead was used to create the bowl. This alloy is particularly brittle at room temperature, and the bowl probably was hot-forged (hammered to shape while hot). But the tin content is at the lower limit of that which can be successfully hot-forged, while the lead content is rather high.[2] The thin recessed lines on the inner surface of the bowl appear to be chased. The metal becomes slightly thicker to either side of the lines, and the surface on the opposite side of the lines seems slightly raised.

The black surface of the bowl may represent the bowl's original appearance. Although some corrosion is present, the bowl seems in remarkably good condition. Small areas of malachite (copper carbonate corrosion) are present.



## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Copper | 81 |
| Tin | 15 |
| Lead | 4 |
| Iron | 0.3 |
| Silver | 0.07 |
| Antimony | 0.05 |

## Notes

1. Howes Smith 1986.

2. Hanson and Pell-Walpole 1951, 317.

# 2

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## *Phiale*

5th–4th century B.C.
Bronze: hammered
Height 4.8 cm
Rim diameter 14.8 cm
Weight 182 g

Arthur M. Sackler Gallery, S1987.74
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1988, 28, fig. 11.

THE FORM IS a shallow hemisphere; the rim is plain and outturned. On the exterior eleven deep petals alternate with eleven shallow petals radiating from the central omphalos. A small flat circle outlined on the interior by a double engraved pattern forms the omphalos.

Phialae, shallow drinking bowls with a central omphalos, were a common vessel type in West Asia and the eastern Mediterranean during the first millennium B.C.[1] The Achaemenid period is rich in phialae decorated with radiating petals or lobes, hammered or cast. Examples made of glass, ceramic, and metal have been recovered from excavations or acquired through the antiquities market, documenting a wide range of subtle variations in form and decoration within this narrowly defined group.[2] Phialae were used, and presumably also made, in sets of drinking implements, which included a ladle, strainer, and situla.[3]

Small bronze phialae were among the most common grave gifts found in the fifth-century B.C. cemetery of Iranian troops at Deve Hüyük, on the border between Turkey and Syria. They have also been recovered from burials at other sites of the Achaemenid period in Syria, Palestine, and Mesopotamia.[4] A silver phiale very similar to the Sackler example was part of the Achalgori treasure found in the Ksanik Valley, Caucasus.[5]

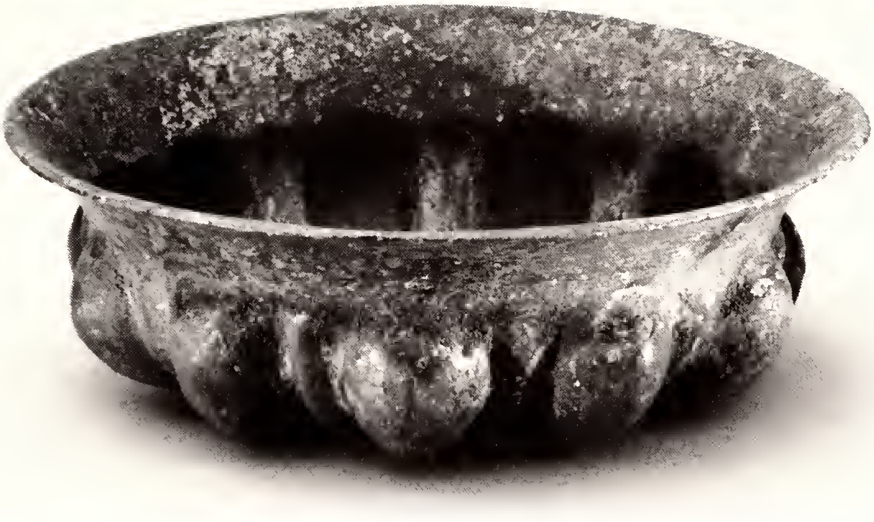
Other comparable specimens, also made of bronze, are in the Metropolitan Museum of Art, New York, and the Los Angeles County Museum of Art.[6]

Given the wide geographical distribution of these vessels, no specific region can be suggested as the source for the Sackler phiale. The bowl was allegedly found in Iran.

## Technical Discussion

Although deeply lobed, unlike the other bronze Achaemenid phiale in the Sackler collection [1], this example appears to have been made in the same way, by raising. The radiographic appearance of this bowl indicates neither casting nor hammering; this is due to the severe corrosion that the bowl has suffered. The thickness of the wall near the rim is 1.25 millimeters, while the center of the bowl is appreciably thicker. Such thin walls would be extremely difficult to cast. The combination of this feature with the composition of the metal—high-tin bronze—strongly suggests that the bowl was hot-forged.

The recessed lines following the perimeter of the lobes appear to be engraved. Again, the condition of the bowl makes it extremely difficult to discern toolmarks. A raised line on the opposite side of the recessed lines does not occur nor does the radiographic appearance of the lines indicate a thickening of the metal on either side of the line. Both these features would occur with chased lines when the metal was pushed to either side of the face of the



tool as it was struck. Also of note is the appearance of recessed lines on both sides of the vessel in the center.

Deep, annular scratches encircle the outer surface of the rim above the lobes. Similar scratches run along the lobes on the outer surface. These appear to be finishing marks. What may be flecks of gold are seen in a number of areas on both the inside and outside surfaces. The gold particles lay on top of and are embedded in the corrosion layer. While the presence of gold may indicate that the bowl was gilded, it is also possible that the gold became entrapped in the corrosion layer during burial and its original source is another object. (The thick layers of corrosion products that conform with those typically found on bronzes excavated from archaeological sites suggest that the bowl was buried.)

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT* |
|---|---|
| Copper | 71 |
| Tin | 28 |
| Lead | 0.5 |
| Iron | 0.2 |
| Silver | 0.09 |
| Antimony | 0.05 |
| Arsenic | trace |

* The severely corroded condition of the bowl does not allow for accurate compositional measurement by the method employed.

## Notes

1. Howes Smith 1986 examines the pre-Achaemenid history of the phiale.

2. The classic reference remains Luschey 1939. Moorey 1980a, 28–30, 32–36, reviews examples of Achaemenid date; also Muscarella 1988, 218–19, nos. 326, 327; both works with further references.

3. Moorey 1980b.

4. Moorey 1980a, 29–38, catalogues the Deve Hüyük examples and cites references to comparable works from Syria and Palestine. A small copper/bronze lobed phiale was recovered from an Achaemenid period grave at Ur: Woolley and Mallowan 1962, 68, 104, 113, pl. 24.

5. Smirnov 1934, 46–47, no. 63, pl. XI.

6. Muscarella 1988, 218–19, nos. 326, 327; Moorey et al. 1981, 108, nos. 627, 628.

# 3

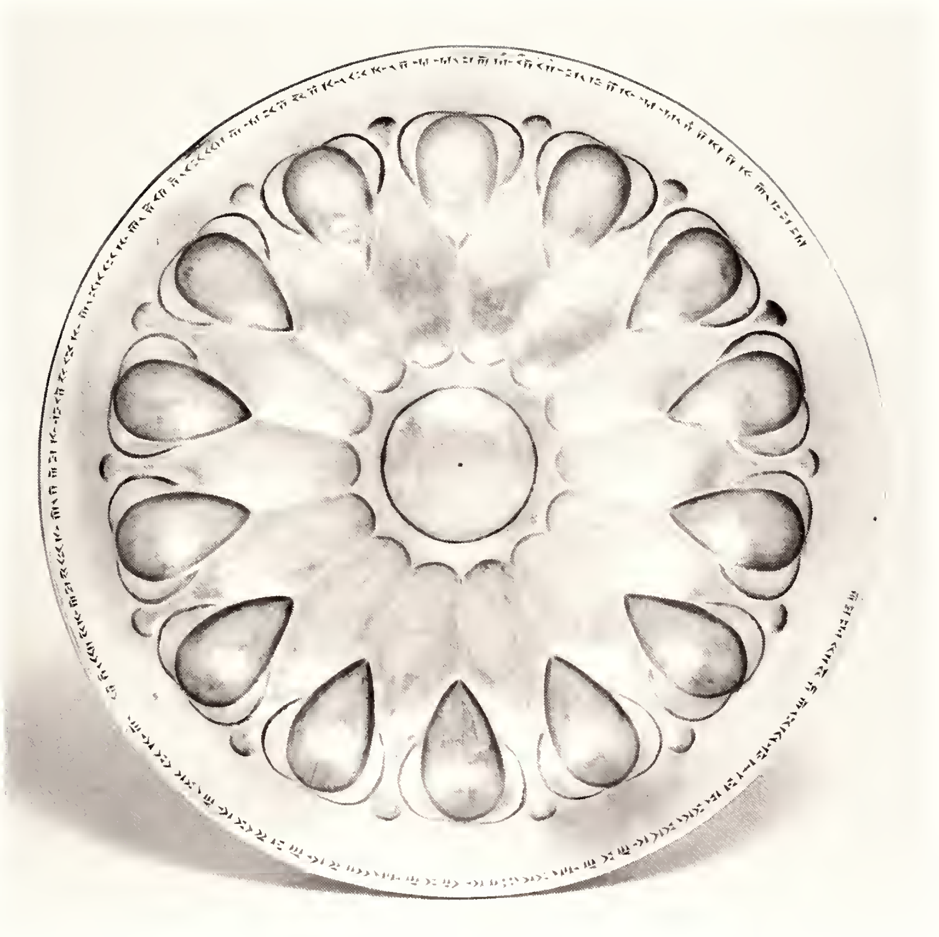
## Phiale

5th century B.C.
Silver: hammered, chased, engraved
Inscribed on inner rim
Height 4.8 cm
Rim diameter 29.5 cm
Weight 922 g

Freer Gallery of Art, 74.30
Purchased from Gawain McKinley, Ltd., 1974
Formerly in the Kevorkian Foundation collection

*Exhibited:* Freer Gallery of Art, from 1974.

*Published:* Herzfeld 1935; Kent 1953, 113, 153, no. A$^1$I; Sotheby's 1970, lot 141; *Archives of Asian Art* 1975–76, 118, fig. 60; Murray 1979, 114–15, no. 88; Gunter 1988, 29, fig. 12.



THIS SHALLOW BOWL has a plain, everted rim. The central omphalos is encircled by fourteen egg-shaped lobes between which radiate leaf-shaped tongues terminating in lotus buds.

An inscription in Old Persian cuneiform encircles the interior rim. It is translated as: "Artaxerxes the Great King, King of Kings, King of Countries, son of Xerxes the King, of Xerxes [who was] son of Darius the King; in whose royal house this silver saucer was made."[1]

There are two identical hallmarks: one on the inner rim near the inscription and another on the outer rim.

This silver bowl belongs to a group of four inscribed silver phialae of similar form, dimensions, weight, and decoration, all inscribed in Old Persian cuneiform for the Achaemenid king Artaxerxes I (r. 465–425 B.C.). The history of the group is interesting and somewhat complicated. The inscription on the bowls was first published by Ernst Herzfeld in 1935, without information on the place of origin or owner of the vessels.[2] One of the phialae entered the Joseph Brummer collection and later, in 1947, was acquired by the Metropolitan Museum of Art, New York.[3] The other three joined the Kevorkian Foundation

collection and then were sold at auction in 1970; one was purchased by the Freer Gallery, a second for the Adam collection.[4] The bowl in the Adam collection was subsequently resold to a private collector in 1975.[5]

Shortly after Herzfeld published the Artaxerxes inscription, its authenticity was questioned.[6] As a shadow therefore also hung over the vessels themselves, the four silver phialae have seldom been introduced in discussions of Achaemenid metalwork. Yet the inscription was apparently never doubted by Roland G. Kent. Moreover, three of the phialae have recently been examined in research laboratories and none has been challenged on technical grounds. This group of phialae should be readmitted to discussions of Achaemenid precious metalware of recognized authenticity.

Parallels for the form of the Freer phiale are also found among uninscribed examples made of silver. One was recovered during excavations at Susa in southwestern Iran, but most lack an archaeological provenance.[7] An uninscribed example identical in form and decoration to those in the inscribed group is in the Metropolitan Museum of Art.[8]

The four silver phialae should also be considered in association with a large group of vessels of Achaemenid date, made of precious metal or of stone, inscribed with the name of the Persian king.[9] The examples collected and published by Georges Posener and Roland G. Kent were augmented by a group of inscribed stone vessels recovered during excavations at Persepolis in southwestern Iran.[10] Additional examples in metal or stone have been recovered from excavations, retrieved as chance finds, or purchased on the antiquities market.[11] Most of the inscribed vessels are stone cosmetic jars or plates bearing the royal titulary in four languages: Old Persian, Akkadian, Elamite, and Egyptian hieroglyphs. The excavated examples give some indication of the original extent of their distribution within the empire. Most numerous are the examples excavated at Susa and Persepolis. From the western part of the empire is an alabaster jar bearing the name of Xerxes (r. 486–465 B.C.) in Old

Persian, Elamite, Akkadian, and Egyptian, found by C. Newton in excavations at the site of the Mausoleum at Halicarnassus.[12] The four silver phialae differ from most other inscribed royal vessels in bearing an inscription only in one language, Old Persian cuneiform. Most other examples inscribed for Artaxerxes I are quadrilingual.[13]

The antecedents of this Achaemenid practice may lie in the Neo-Assyrian period. A squat alabastron made of glass, inscribed with the name of Sargon II (r. 721–705 B.C.), was found at the ancient capital of Nimrud on the banks of the Tigris near Mosul, and stone vessels inscribed for the Assyrian king Ashurbanipal (r. 668–626 B.C.) have been recovered from Assur and Persepolis.[14] Another, perhaps more likely, source of inspiration was Egypt, where vessels made from a variety of materials, including glass, alabaster, and metal, were often inscribed for pharaohs. Egyptian stone vessels inscribed for pharaohs of the Twenty-fifth Dynasty (ca. 747–656 B.C.) were found in the Treasury at Persepolis.[15]

For whom were the Achaemenid vessels with royal inscriptions created, and what purpose did they serve? In his study of stone vessels with cuneiform and hieroglyphic inscriptions, many of which were found in Susa, Georges Posener suggested that the vases were probably made in Egypt and exported as gifts containing valuable substances, such as perfumed oils.[16] The other stone vases inscribed for Xerxes found in the Persepolis Treasury include a number of plates whose form suggests an Egyptian origin; whether they were made and inscribed in Egypt or at Persepolis by foreign or native artisans could not be determined.[17] Royally inscribed vessels made of precious metal, like the four silver phialae, were certainly sent abroad as gifts. Comparable specimens may also have been part of the royal dinner service, commissioned and used by the Persian king.[18]

## Technical Discussion

The phiale was formed by hammering, most probably by a combination of raising and sinking. Recessed centering marks are found on both sides of the vessel. The recessed lines delineating the lobes and other forms were chased.

Burnishing marks, present over most of the surface, were caused by the finishing process, which left a slightly fluted surface. The same feature is found on some other works of Achaemenid silver. One example is a spoon excavated at Pasargadae; published photographs show a similar surface on the inside of the bowl of the spoon.[19]

The inscription was formed by what might be loosely described as engraving. Some form of chisel or cutting tool, rather than a gravure, was used to remove the metal from the strokes of the characters.

Two identical rectangular punch marks, measuring 1.3 millimeters by 0.7

millimeters, are present on both the front and back surfaces near the rim. These punch marks appear to be a European hallmark, but their lack of detail makes them unidentifiable. A similar hallmark is present on the phiale in the collection of the Metropolitan Museum of Art. It is not unusual to find European hallmarks on ancient silver objects [see, for example, 13] as silver imported to Western Europe was frequently stamped.

The vessel is in excellent condition. A few minute areas of copper corrosion are present. One part of the inscription is severely abraded.

Two of the other three phialae of this group have been analyzed; they and the Freer phiale are virtually the same in composition.[20]

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 97.3 |
| Copper | 2.41 |
| Gold | 0.337 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.11 |
| Zinc | 7.0 |
| Tin | 40 |

| | PARTS PER MILLION |
|---|---|
| Arsenic | 0.37 |
| Antimony | 0.22 |
| Selenium | 0.39 |
| Iron | 6.2 |
| Cobalt | 0.019 |
| Mercury | 0.16 |
| Chromium | 0.22 |
| Scandium | <0.0016 |

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Silver | 96.5 |
| Copper | 2.5 |
| Gold | 0.5 |
| Lead | 0.9 |

## Notes

1. Translation in Kent 1953, 113, 153.

2. Herzfeld 1935, Herzfeld 1937. Some subsequent publications have given the vessels a provenance in Hamadan, but no evidence substantiates this suggestion; Muscarella 1980, 32–33.

3. Wilkinson 1948–49, 197. This bowl was shown in New York in 1940 at the exhibition of Persian art organized by the Iranian Institute of America: Ackerman 1940, 322, no. 37.

4. Moorey 1974, 183–84, no. 181.

5. Sotheby's 1975, no. 46. The location of the fourth phiale is unknown to me.

6. Herzfeld 1937 defended the authenticity of the vessels and inscriptions against the objections made by H. H. Schaeder.

7. Luschey 1939, type 1, 41–60.

8. Schmandt-Besserat 1978, no. 91.

9. Posener 1936, nos. 37–99; Kent 1953, 109 (DPh), 111–12 (DH), 113 (XH).

10. Stone vessels inscribed with Xerxes' name were recovered from the Persepolis Treasury: Schmidt 1957, 84–91.

11. A fragment of an alabaster vase inscribed with Xerxes' name was found at Uruk in southern Mesopotamia: Strommenger 1967, 41, pl. 54: 3–4. An alabaster vessel fragment excavated at Sephoris in Palestine preserves part of an inscription in Elamite and Akkadian naming an Artaxerxes (probably I): Kelsey Museum 90109 (unpublished). A vessel inscribed in four languages with Artaxerxes' name was found in 1971 at Orsk in southern Russia: Mayrhofer 1978, 28. A silver sheet-metal fragment bearing an inscription of Darius, part of a hoard, was published in Hulin 1972; for the hoard, see Kraay and Moorey 1981. Examples without archaeological provenance include a gold bowl bearing an inscription of Darius in Old Persian, Elamite, and Akkadian, now in the Metropolitan Museum of Art: Wilkinson 1954–55, 224.

12. Posener 1936, no. 51; Kent 1953, 115 (XVs).

13. Posener 1936, nos. 78–82, catalogued five vases with Artaxerxes' inscription, all in four languages. For additional comments on the royal titulary among Artaxerxes' inscriptions, see Schmidt 1957, 86–87. The Orsk inscription (above, n11) is also quadrilingual. An alabaster vase in the British Museum, London, has an Aramaic inscription mentioning the thirteenth year of Artaxerxes; the authenticity of the inscription has, however, been questioned: Moorey 1980a, 47, with additional references. In addition to the four silver phialae, only one other royal inscription on a vase is in Old Persian only, a vase bearing Xerxes' name: Kent 1953, 113 (XH).

14. Barag 1985, no. 26. For the stone vessels, see Schmidt 1957, 83–84. Roger Moorey has reminded me of the Urartian practice of inscribing metal vessels with a statement of royal ownership or a dedication to a deity: Seidl 1988, 170–71.

15. Schmidt 1957, 81–83.

16. Posener 1936, 189–90; Schmidt 1957, 85–87.

17. Schmidt 1957, 87.

18. Nylander 1968, esp. 125–27; Moorey 1974, 184; Lewis 1989. Other relevant articles are found in the volume edited by Briant and Herrenschmidt 1989.

19. Stronach 1978, pl. 151.

20. The two comparable phialae for which analytical results are available are given below.

| | BY PERCENT<br>Metropolitan Museum<br>(ACC. NO. 47.100.84)* |
|---|---|
| Silver | 97.1 |
| Copper | 2.55 |
| Gold | 0.321 |

| | Formerly<br>Adam Collection** |
|---|---|
| Silver | 96.2 |
| Copper | — |
| Gold | 0.36 |

* Analyzed by Pieter Meyers using neutron activation analysis.

** Analyzed by A. A. Gordus using neutron activation analysis (Moorey 1974, 182).

# 4

## *Jug*

4th–3d century B.C.
Bronze and gold: hammered and chased with applied cast handle
Height 22.8 cm
Max. diameter 13.2 cm
Weight 812 g

Arthur M. Sackler Gallery, S1987.134
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*

THE VESSEL CONSISTS OF a cylindrical neck, pear-shaped body, and disk base. The plain neck opens out to an everted rim, with a vertically hatched flange. The handle, made separately and attached at the rim, joins the body at the vessel's greatest diameter. The upper part of the handle terminates in an upright floral form; floral decoration also fills the area between the handle and the rim. The lower part of the handle forms a palmette. At the top and near the bottom of the handle are two tiny bosses, imitations of a pair of metal rivet heads.

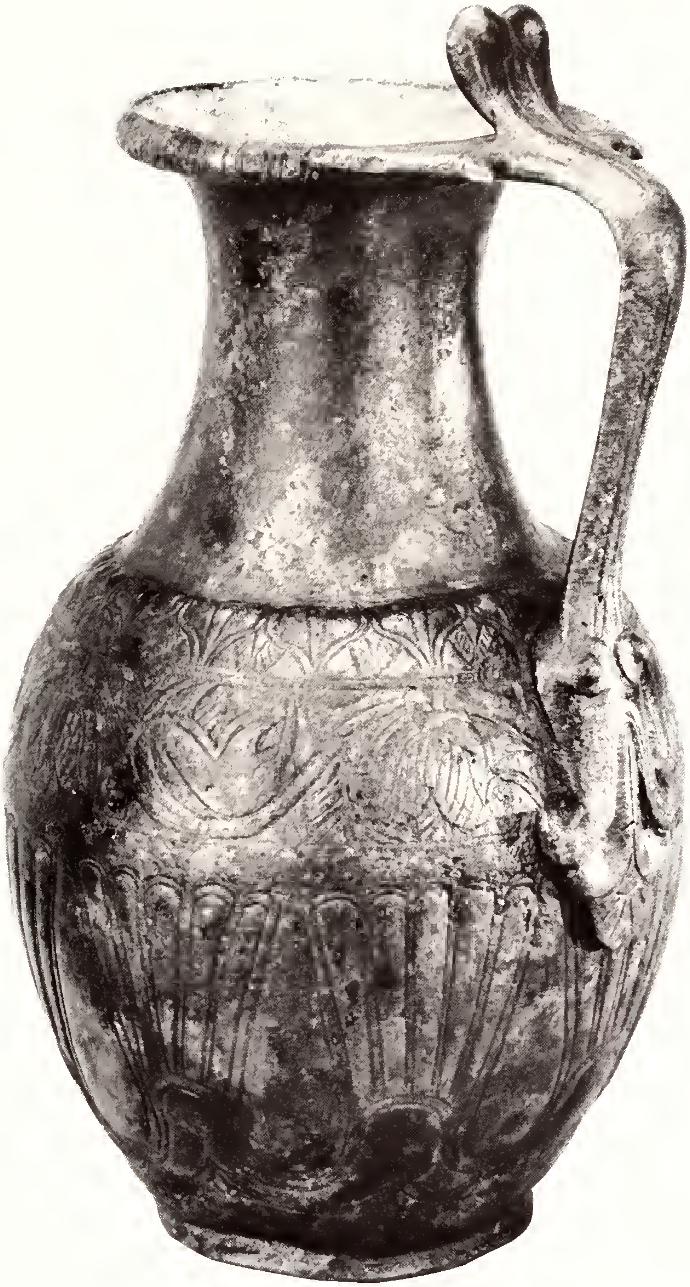
Chased decoration is arranged in three horizontal bands on the body of the jug. From top to bottom: a narrow band with heart-and-dart; a wider band with a continuous calyx pattern; a tall zone extending from the greatest diameter of the vessel to just above the base, filled with a continuous lotus-and-palmette pattern. Traces of gilding are preserved on the exterior, suggesting that the surface or details of the chased decoration were originally gilded.

I know of no exact parallels for this object. A bronze vase of related form, with floral decoration inlaid in silver, is in the Metropolitan Museum of Art, New York; it is assigned to the Seleucid or Parthian era and may have an Iranian provenance.[1] The Metropolitan vase, however, appears to be of later date than the Sackler example. The jug most closely approximates a group of metal vessels, most of them made of silver, produced in Greek or Egyptian workshops during the late fourth and third century B.C.[2] A silver jug of related form, with a lower handle attachment forming a palmette, has been recovered from a tumulus in Bulgaria dated to the first half of the fourth century B.C.[3] Egyptian metal, ceramic, and faience vessels of the fourth and third century B.C. are decorated with vegetal patterns similar to those of the Sackler Gallery jug, pointing toward an Egyptian workshop as the source of inspiration, if not manufacture, for this metal vessel.[4]

Given the extent of interaction among metal workshops of the eastern Mediterranean and the Near East in the late fourth and third century B.C., it is difficult to assign the Sackler Gallery jug to a particular region. A place of manufacture on the Greek mainland cannot be excluded, but an eastern Mediterranean workshop seems most probable. The jug is allegedly from Iran, but no well-documented evidence for the source or distribution of similar vessels corroborates this information.

### Technical Discussion

The body is extremely corroded and has been extensively cleaned in the past. It is, therefore, difficult to discern how the jug was made. Analysis of the metal and variations in the thickness of the body, however, suggest the manufacturing technique. The thickest areas of the body are at the rim and foot, while the midsection, where the diameter is greatest, is thinner. The metal of



the body is a tin bronze with virtually no lead present. This is in contrast to the handle, which has a similar tin content, but with the addition of a significant amount of lead. The differences in composition and the variations in the thickness of the body suggest that the shape of the body was formed by hammering while the handle was cast and then attached to the vessel. A slight gap at the juncture of the handle and the body is filled by a material with an irregular surface texture. The hardness of this material, its radiographic density, and its corrosion products indicate that it is a hard solder.

The ornament is chased; these lines stand in relief on the inner surface of the jug. Annular bands of opposing crescent-shaped punch marks, which create an effect similar to ring matting, define the various design registers. On the bottom of the foot five annular recessed lines encircle a centering mark. A raised area corresponding to these lines does not appear on the inner surface of the foot, which suggests that these lines are engraved, but the accretions in this area make it difficult to arrive at a conclusive assessment.

What appear to be rivet heads, placed in pairs at the top and bottom of the handle, are simply bosses cast as one with the handle. The radiographic image of this area does not distinguish between the handle and the bosses nor is a compositional difference revealed by X-ray fluorescence analysis.

Minute traces of gilding are present in many areas on the body and handle. It could not be determined whether the vessel was originally gilded or if the specks of gilding are from another source. Because of the extent of the gilding and its intimate contact with the surface of the vessel, it seems very possible that the jug was once gilded.

## Composition

As determined by surface analysis using energy dispersive X-ray fluorescence (average of two measurements):

| | Body | Handle |
|---|---|---|
| | PERCENT | |
| Copper | 91 | 70 |
| Tin | 9 | 11 |
| Lead | 0.2 | 19 |
| Iron | 0.23 | 0.5 |
| Silver | 0.06 | 0.2 |
| Antimony | 0.03 | 0.3 |

The extensive corrosion of the surface must affect the accuracy of the analyses of the vessel. X-ray fluorescence surface analyses of corroded copper alloys, particularly when they contain lead, may overestimate the baser elements of the alloy.[5] The absence of lead in the analysis of the body metal is probably correct. The tin content may be overestimated, although the comparable measurements of tin in the body and handle seem too great to be fortuitous.

## Notes

1. Muscarella 1988, 299, no. 427.

2. Dumbrell 1971, 35–36 with fig. 2, with additional references to silver vessels of the Achaemenid period found in Egypt. Some of the Tell al-Maskhuta bowls are also discussed in Oliver 1977, esp. nos. 8–11; also Reeder 1988, 124, no. 41 (silver calyx cup). See also the references cited below, n4.

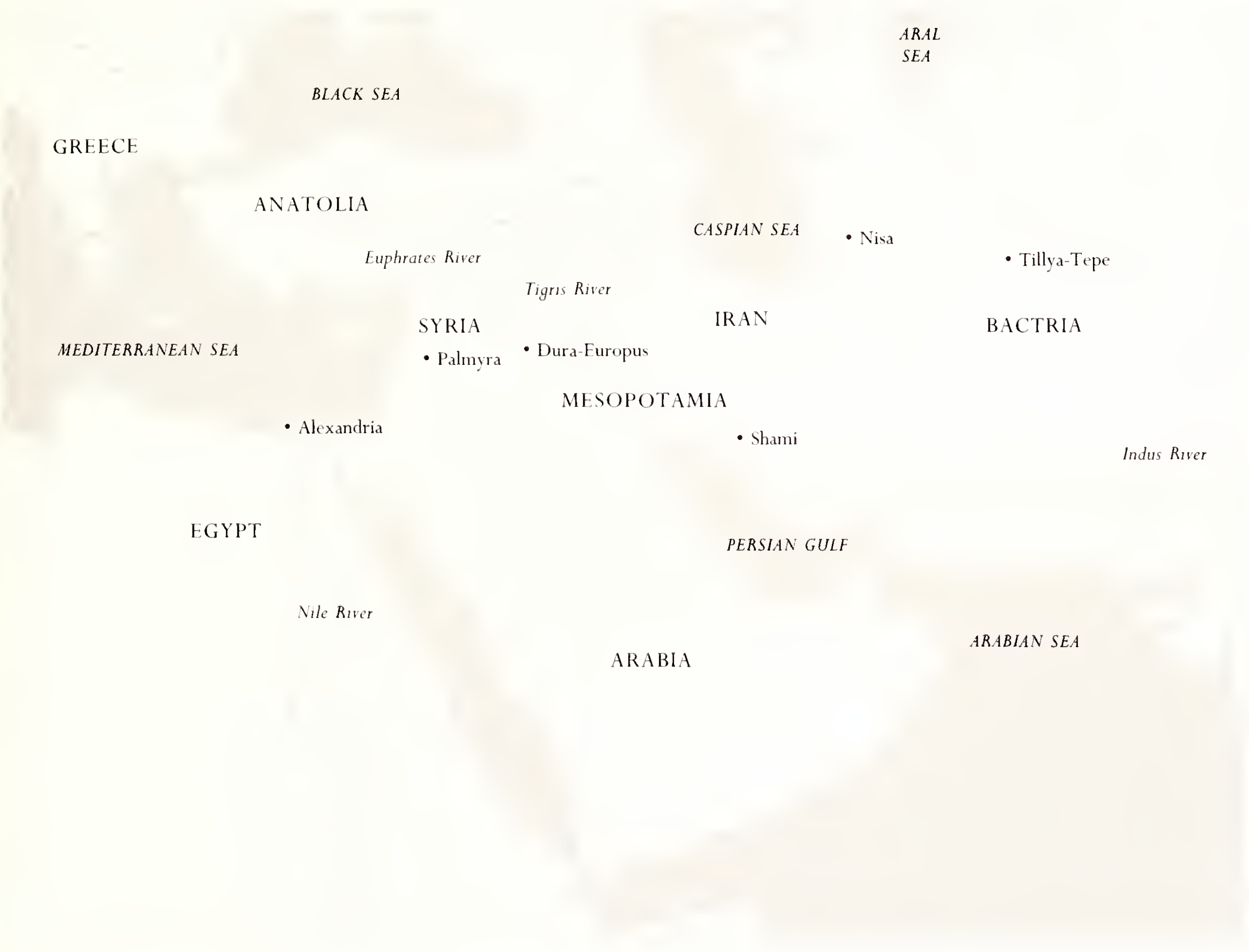
3. *L'or des cavaliers thraces* 1987, 210, no. 350 (silver-gilt jug labeled *"cruche-rhyton";* height 16.5 cm; diameter 9 cm; the jug is part of the Vraca treasure, dated 380–350 B.C.). Bronze jugs with attached handles in the form of a lotus and lower palmette constituted a characteristic metal group of New Kingdom Egypt: Radwan 1983, 133–37.

4. Silver vessels from the Tukh al-Qaramus treasure are discussed and illustrated in Pfrommer 1987, esp. pls. 6–8.

5. Atil, Chase, and Jett 1985, 262–64.

# Seleucid and Parthian Periods

## Circa 312 B.C.–A.D. 224



# 5

## *Bowl*

2d–early 3d century A.D.
Silver: hammered, repoussé, chased, traced, engraved
Height 5.8 cm
Rim diameter 21.8 cm
Weight 545 g

Arthur M. Sackler Gallery, S1987.144
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1988, 38, fig. 21.

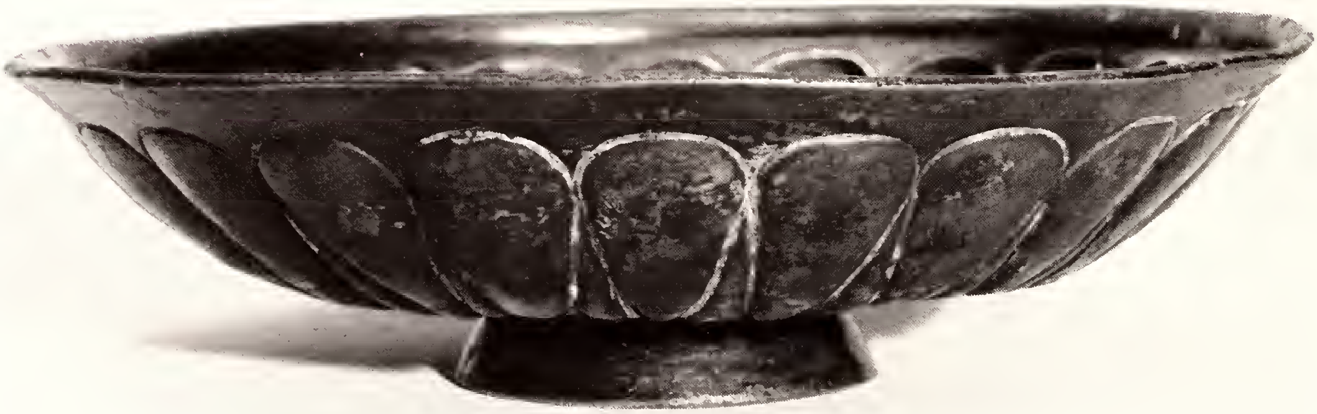
THE BOWL SITS on a relatively tall ring foot, the resting surface of which is flattened. The rim is plain and thickened on the interior; an engraved line about one centimeter below the inner rim circumscribes the bowl. Within the ring foot are a centering mark and concentric circles. A double pattern of twenty-one radiating petals, with smaller petals between the wider ones, decorates the bowl exterior. The interior center is plain.

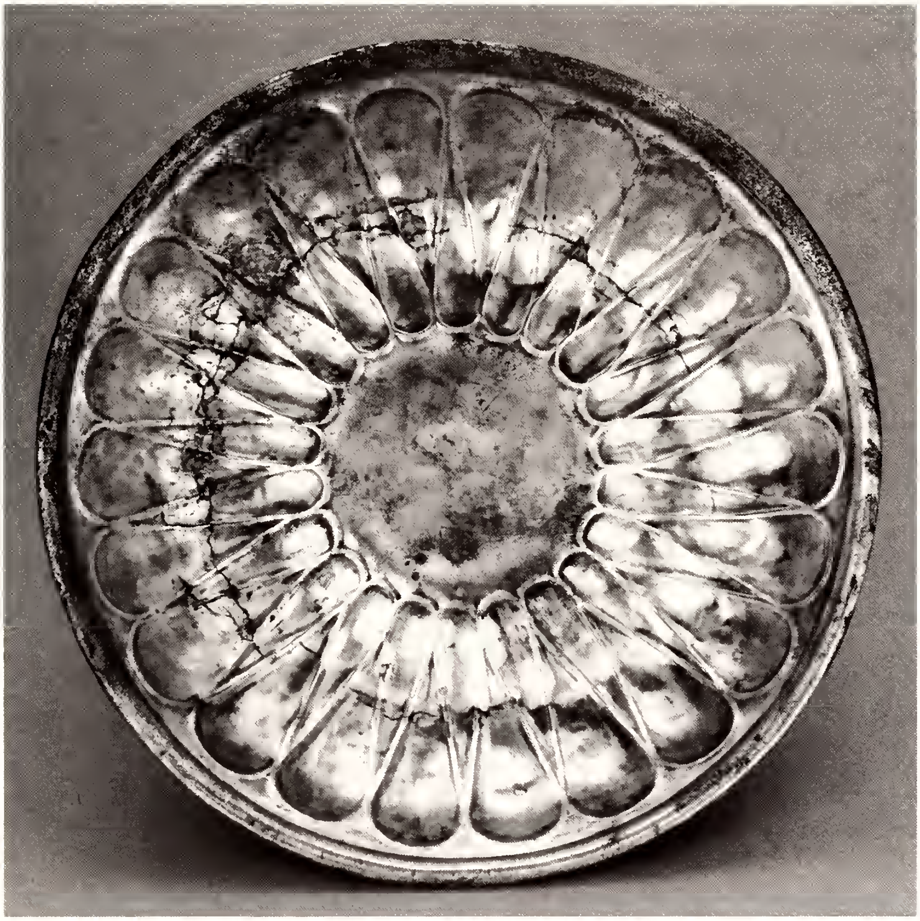
The shape of this vessel is probably descended from the Achaemenid phiale [see 1–3]. A silver bowl of similar form and decoration, now in the British Museum, London, has chased figural decoration on the interior: enclosed within a medallion is a reclining male banqueter, accompanied by a seated female and a servant.[1] The hairstyle and dress of the figures are most closely paralleled among funerary sculptures from Palmyra in central Syria, dating to the second and third centuries A.D., thus providing an approximate date for the British Museum and the Sackler Gallery bowls.[2]

The pattern of radiating petals resembles the continuous ornament on silver bowls from Sogdiana in Central Asia, dating to the sixth or seventh century. But the Sogdian examples have a deeper shape and a more conical foot and are decorated with a central omphalos or a rosette.[3] A place of manufacture and date closer to Iran in the late Parthian period, like the bowl with figural decoration in the British Museum, seem more probable for the Sackler vessel.

### Technical Discussion

The vessel consists of two parts, the body and the foot. No evidence of solder is seen on the surface or in radiographs of the vessel, and the two parts may have





been mechanically joined. The body bears a raised decoration of radiating petals.

The thickness of the rim averages 3.8 millimeters, while the thickness of the walls of the lobes just below the rim is approximately 1.0 millimeter. The body thickens at its center (within the lobed decoration) and the foot is joined to this area. The thickness of the foot varies, becoming greater toward the bottom, reaching a maximum of about 4.3 millimeters.

By use of radiography and microscopic examination, one can see that the annular lines on the bottom of the vessel within the foot are engraved while the outline of the lobes is chased. The greater radiographic density apparent just outside and parallel to the outline around the curved ends of the lobes indicates chasing, but the straight, recessed lines separating the lobes exhibit striations and very faint toolmarks. These features suggest that the straight portions of the tooled lines have been traced (impressed by running a round-ended tool up and down their length). The outline of the rim on the inside surface also appears to have been strengthened by engraving. A gravure with a V-shaped end was used for this task.

It appears that the silversmith used small chased dots as guides for the various forming operations. Surface finishing and subsequent corrosion and clean-

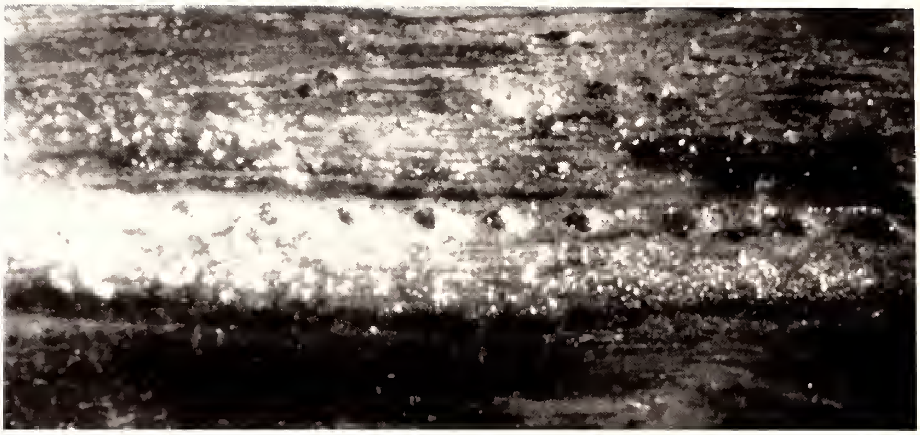


Fig. 1. Photomicrograph of a row of chased dots at the juncture of the foot and body.

ing have obliterated most of these toolmarks. There is, however, one area where they can be clearly seen. A row of chased dots is present on the outside surface of the foot where it meets the body and apparently marks the line of juncture between the two parts (fig. 1).

The dish has suffered over time. The body was crushed or pressed down over the foot, resulting in the development of cracks running in a circular direction around the foot. Some small losses occurred and were filled, probably recently. The vessel is very etched, pitted, and scratched, most notably along the rim.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence:

| | Body* | Foot** |
|---|---|---|
| | PERCENT | |
| Silver | 97 | 97 |
| Copper | 3 | 2 |
| Gold | 0.5 | 0.6 |
| Lead | 0.5 | 0.6 |

* Average of four measurements.

** One measurement.

## Notes

1. My thanks to Prudence Harper for this reference. Barnett and Curtis 1973, 127, pl. LVIIA. The bowl was previously published in *Sept mille ans d'art en Iran* 1961, no. 733B.

2. Colledge 1976, pls. 61, 62.

3. Marshak 1986, figs. 36, 37. Such bowls are also depicted in Sogdian painting; a sketch of one is reproduced in Azarpay 1981, 121, fig. 53. Compare also a silver bowl with similar decoration but taller ring foot, described as a sixth-century Sasanian vessel: Sotheby's 1987, no. 83.

# 6

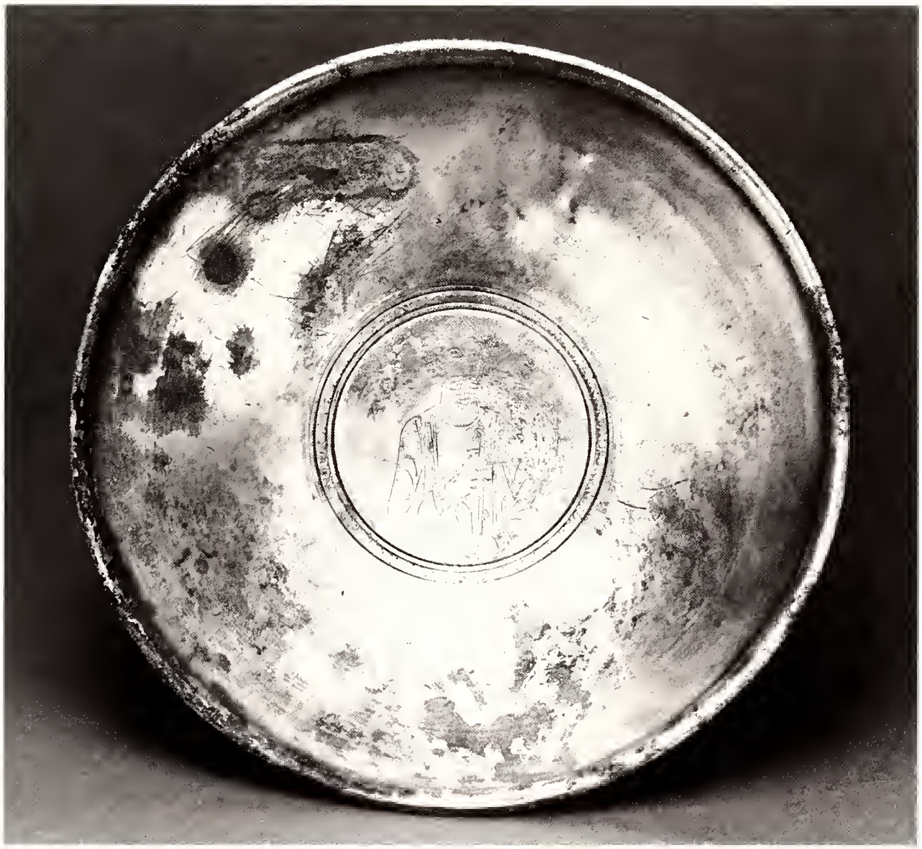
## *Bowl*

2d–early 3d century A.D.
Silver and gilt: hammered, chased, engraved
Height 6.3 cm
Rim diameter 20.5 cm
Weight 668.6 g

Arthur M. Sackler Gallery, S1987.114
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



THE SHALLOW BOWL rests on a flaring ring foot; the ring is flattened and is wider than the wall of the ring, forming a flangelike resting surface. Petaled forms resembling vertical fluting, beginning about 1 centimeter above the ring foot and radiating slightly from base to rim, decorate the exterior. The fluting ends in a scalloped molding about 2.5 centimeters below the plain rim; above the molding, the rim continues at a slight outward angle. Within the foot ring are three grooved concentric circles.

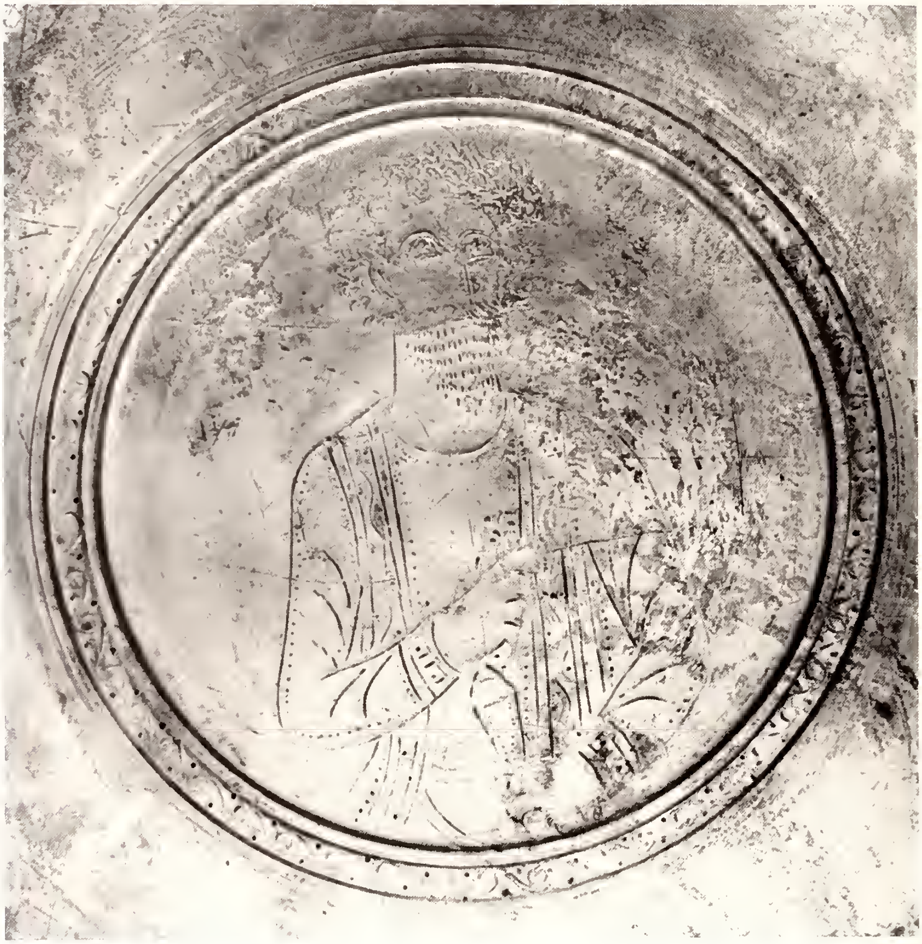
In the bowl interior is a central medallion 8 centimeters in diameter, encircled by double grooves and a continuous wave pattern decorated with small chased dots. Within the medallion, finely chased and engraved, is the head and torso of a male figure in three-quarter view, facing right. He wears Parthian dress, with a coat over a tunic; he has curly hair and a beard rendered with short dashes. His right arm is bent at the elbow, perhaps to hold a fold of his garment. His left arm is more gently bent; in his left hand he holds an object (sword hilt?).

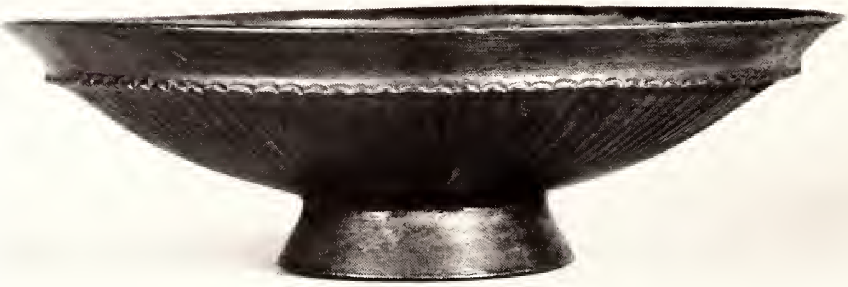
Traces of gilding within the medallion indicate that the figure was originally gilded.

Silver bowls of open form, with an interior central medallion enclosing a chased figure, occur among Roman silver plate dating to the late second century A.D.[1]

The petal design on the exterior of the Sackler bowl resembles decoration on Hellenistic moldmade ceramic relief bowls dating from the third to first century B.C., which have silver counterparts of probably contemporary date and a wide distribution.[2]

A more precise artistic home for the Sackler silver bowl emerges from a study of the interior decoration. Parallels for the figure and style of dress are found among the stone funerary sculptures from Palmyra in central Syria, dat-





ing to the second and third centuries A.D. During this period many inhabitants of the city were represented in Parthian dress on the funerary monuments they commissioned.[3]

This bowl has no parallels and is therefore of exceptional interest in documenting silver plate of the late Parthian period (perhaps made in a Syrian workshop). It is also important as a late Parthian prototype for the early Sasanian silver-gilt bowls with interior medallion enclosing a human bust [see 24].

## Technical Discussion

The attributes that would indicate either casting or hammering as the forming method of this vessel are not clearly distinguished by radiography. The variations in the wall thickness, however, are typical of hammered plates, although the walls of this vessel are rather thick compared with those of other bowls and plates discussed here. The rim varies between 3.0 and 3.3 millimeters in thickness, while the area at the top of the flutes measures 3.7 to 3.9 millimeters. The wall thickness between the rim and the flutes and below the top of the flutes is 1.25 and 1.0 millimeters, respectively. The wall of the foot is also quite thick, roughly 3.3 millimeters overall, except at the bottom, where it is 4.8 to 5.0 millimeters thick.

The foot of this vessel appears to have been attached using solder, like many of the plates described here. What is different, however, is that it seems that the entire line of juncture both inside and outside was filled with solder and finished to give a concave surface where the body meets the foot. Two features suggest the use of this method. First, a band of heavier corrosion products is present along the juncture. Solder, being richer in copper, would corrode in preference to the more silver-rich body and foot. Second, a small gap is present in one area at the top edge of the foot where it meets the body, which appears to be a spot that did not fill with solder.

The figure in the medallion was formed by chasing and engraving. The short lines and dots were chased, while the long lines were engraved at an angle so that the lines are beveled. This feature is most noticeable along the outline of the figure. Chasing also defines the ends of the carved radial flutes and decorative band of the medallion. Minute traces of gilding are present on the decorative band. X-ray fluorescence analysis does not indicate the presence of mercury nor does the gilding have the microscopic appearance of amalgam gilding. The gilding is thus probably leaf gilding.

A centering mark is found on the outside surface. Three concentric lines inside the foot circle the center mark; one concentric engraved line is present outside the foot at the bottom of the flutes. Annular finishing marks are present on the inside and outside surfaces between the rim and top of the flutes. On the outside surface in one area at the top of the flutes are what appear to be chatter marks. Traces of silver sulfide and silver chloride corrosion are found in many areas. A tremendous amount of scratching, random wear, and surface loss due to corrosion has also occurred.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---:|
| Silver | 96.1 |
| Copper | 3.37 |
| Gold | 0.487 |

| | PARTS PER MILLION |
|---|---:|
| Iridium | 0.0021 |
| Zinc | 13 |
| Tin | 25 |
| Arsenic | 0.96 |
| Antimony | 0.53 |
| Selenium | 1.5 |
| Iron | 42 |
| Cobalt | 0.046 |
| Mercury | 0.073 |
| Chromium | 0.29 |
| Scandium | 0.0016 |

## Notes

1. Baratte 1981, 44–45, no. 9, pls. XIV, XV (with young male figure facing left). Prudence Harper kindly supplied this and the following references to comparisons for [6].

2. Rotroff 1982, 1–10, discusses nomenclature and the relationship between ceramic and metal bowls. For examples made of silver, see Oliver 1977, 76–77, nos. 41, 42.

3. Colledge 1976, 68–69.

# 7

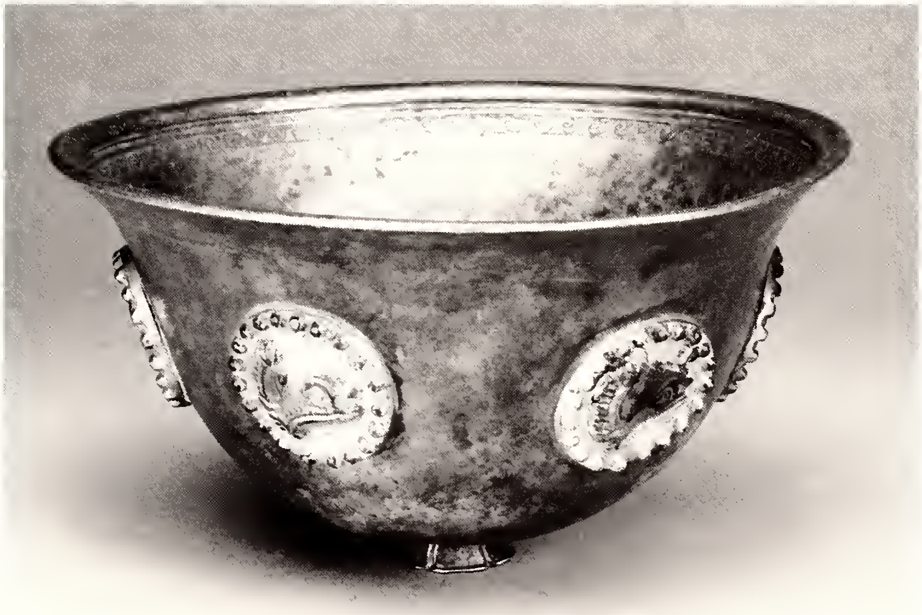
## *Bowl*

2d–1st century B.C.
Silver and gilt: hammered, carved, chased, gilded
Bowl height 9.7 cm
Rim diameter 18.7 cm
Weight 519 g
Roundels diameter 3.9–4.0 cm
Roundels thickness 0.5–0.6 cm
Foot diameter 2.9 cm
Foot thickness 0.6 cm

Arthur M. Sackler Gallery, S1987.133
Gift of Arthur M. Sackler, 1982

*Never exhibited*

*Unpublished*

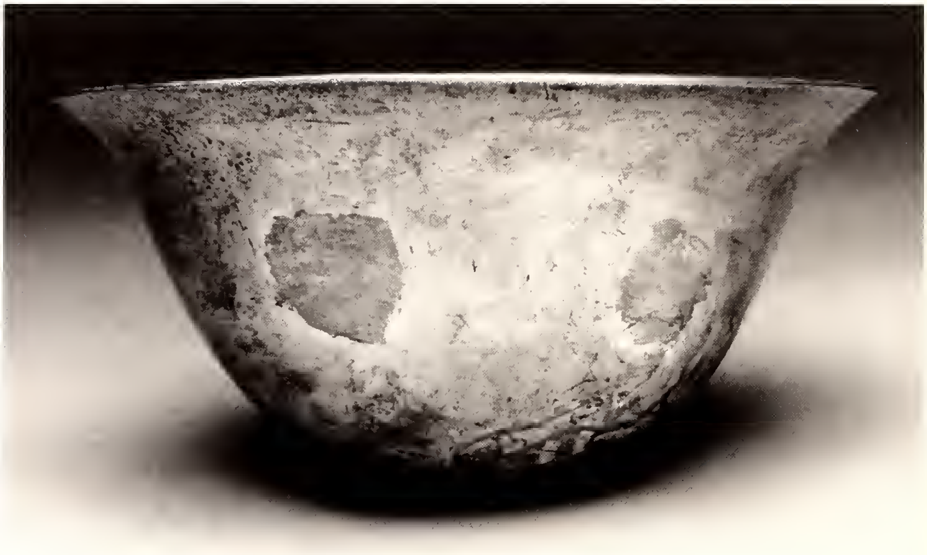


THE WALLS OF THIS deep bowl rise from a gently rounded base to a slightly outturned molded rim. A gilded scroll pattern circumscribes the inner rim.

At the time the bowl was accessioned into the Sackler Gallery, the exterior was decorated with six gilded roundels enclosing a boar's head in relief and the base had an attached rosette. The roundels and rosette were subsequently removed by the museum's Department of Conservation and Scientific Research to restore the bowl to its original, undecorated state.

This bowl exemplifies a common Hellenistic vessel shape, known both in ceramic and metal versions, which had a wide distribution in Greece and Asia Minor. A good parallel for the Sackler example, with a more angular rim molding, is in the Dumbarton Oaks Collection, Washington, D.C.; it is reportedly from Greece or Asia Minor and is dated to the first century B.C.[1]

The six roundels that were removed from the bowl are virtually identical in dimensions and decoration. On the surface of each is a boar's head executed in relief, in profile facing right, surrounded by a pearl border; both the background and the heads are gilded. Boars' heads shown in profile, enclosed in a pearl border, are known from Sasanian textile patterns and decorative stucco, and the boar's head itself was an important royal and religious symbol in Sasanian art.[2] Whether the roundels are authentic Sasanian artifacts is difficult to determine on stylistic or typological grounds. Since technical observations suggest that they may have been fitted originally on the reverse with loops and served as attachments of some kind, they may represent a set of roundels made for attachment to clothing or belts. Several examples of such silver-gilt



roundels, decorated with the figure of a bird or animal in profile within a pearl border, are attributed to the Sasanian period. One unpublished example, now in Rome, encloses a boar's head.[3]

## Technical Discussion

The bowl was formed by hammering. It has a thickened rim measuring roughly 4 millimeters, while the body measures 1.25 millimeters just under the rim and decreases to 0.5 millimeters near the point of greatest curvature. The simple band at the bottom of the bowl is somewhat thicker than the body.

Remnants of leaf gilding are present on the scroll band and narrow concave band above it. The concave band and center band on the inner surface appear to have been carved, while the scroll decoration was chased. The outer surface opposite the center band is slightly recessed.

Cracks are present in the metal and two small areas may be filled losses. The six roundels and floral-shaped foot were attached with soft solder. After removing the roundels, it was found that the surface of the bowl had been scored with a file so that the solder would adhere better. Where the surface of the bowl underneath the roundels was undisturbed, scratches and corrosion products comparable to those found on the rest of the bowl were present, indicating that the roundels had been applied in the recent past.

The age of the roundels is difficult to determine. Chasing was used to create the details of the boars' heads and a large doming punch was employed to form the pearl borders. Amalgam gilding was also employed. The roundels, however, appear cast. Their wall thickness is fairly regular, and their back surfaces are slightly depressed and pebbly, features that do not correspond with those of objects formed by hammering.

The small foot that was removed from the bowl was also attached using soft solder. It was formed by hammering and decorated with chasing and leaf gilding. Although exhibiting some wear, it bears little tarnish. The age of this piece is unclear.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of three measurements):

| | PERCENT |
|---|---|
| Silver | 97 |
| Copper | 1.3 |
| Gold | 1.1 |
| Lead | 0.5 |

## Notes

1. Richter 1956, 46–47, no. 30, pl. XIXD; she noted traces of niello on the rim.

2. Carol M. Bier in Harper 1978, 128–29, with further references. For the device in stucco decoration, on an example from Damghan in northeastern Iran: Kröger 1982, pl. 88, fig. 5.

3. Harper 1978, 63 with n. 3.

# 8

## *Vessel handle*

1st century B.C.–1st century A.D.
Bronze: cast and incised
Length 21.6 cm
Width, *across body of panther,* 3.0 cm, *at widest point,* 9.0 cm
Weight 545 g

Freer Gallery of Art, 09.139
Gift of Charles Lang Freer, 1923
Purchased from M. Nahman, 1909

*Exhibited:* Freer Gallery of Art, from 1964.

*Unpublished*

MODELED IN THE FORM of a leaping panther, this handle also preserves the place it was attached to a vessel rim. Below the place of attachment is a modeled head of a ram, the sweeping horns of which extend to the lower rear legs of the panther. The feline's body and forelegs are fully extended. The mouth of the animal is open.

This zoomorphic handle apparently belonged to a large, open vessel (see below, Technical Discussion). When attached, the panther would have appeared to be leaping away from the vessel.

The object has been exhibited as an Iranian work of the Parthian period on the basis of comparisons with several bronze objects identified as incense burners, the handles of which are modeled in the form of a feline. One example with a feline handle is now in the Cleveland Museum of Art; it was reportedly recovered from western Iran and has been dated on stylistic grounds to the Parthian period.[1] Another handle of this type, presumably from an incense burner, is in the Norbert Schimmel collection.[2] The site of Taxila in northeastern Pakistan yielded two incense burners with handles in the form of a lion and a winged lion from levels of the Parthian period.[3] Several vessel handles made of bronze and fashioned in the form of felines have also been assigned to the Parthian period on the basis of sculptural style. They seem, however, to be closer to the Achaemenid amphora handle fashioned as a rampant animal with head turned away from the body.[4] But the Freer handle also finds precedents in type and style with Greek bronze vessel handles of zoomorphic or anthropomorphic form, attached to shallow bowls. The panther, associated with Dionysus, was appropriate to adorn a drinking vessel.

This handle was purchased in Cairo. An Egyptian place of manufacture, perhaps in an Alexandrian workshop, is therefore plausible.

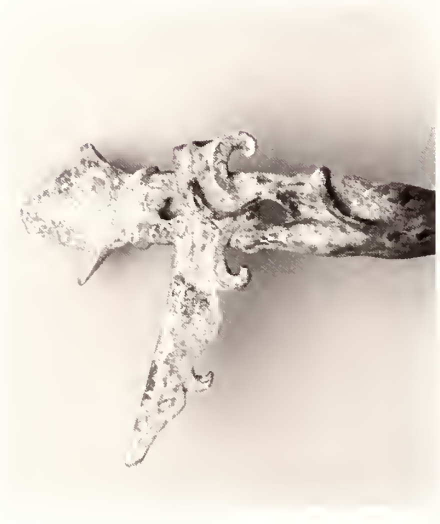
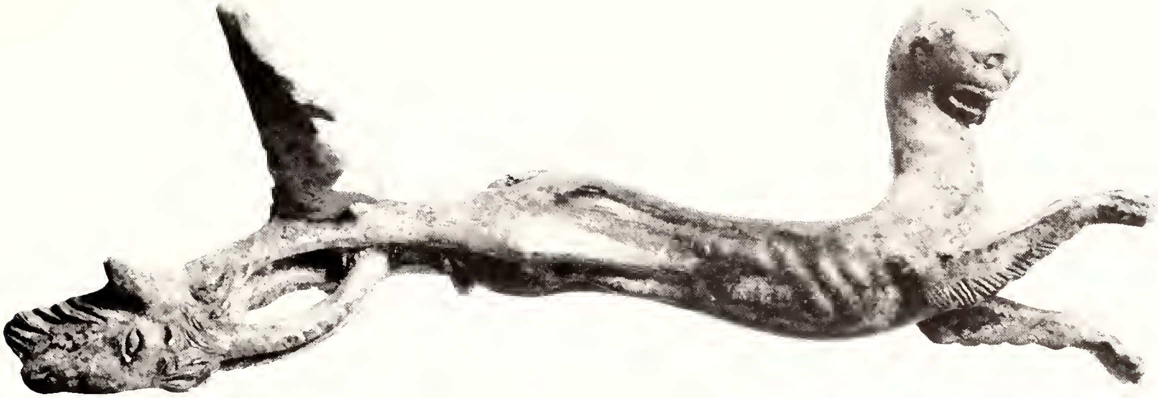


Fig. 1. Top view of the feline handle.

## Technical Discussion

The handle is a solid casting. All the various parts of the handle were cast as one piece. Larger details, such as the eyes and mouth of the panther, were defined by chiseling or incising. Finer decorative details, such as the fur on the underside of the panther's forelegs, were also incised.

A semicircular element, that presumably attached the handle to the rim of the object, is broken and incomplete (fig. 1). To the proper right side of the panther, this element appears essentially intact. The arc described by the semicircular element has a radius of roughly sixteen centimeters, and thus if it were attached to a circular rim, the rim would have measured about thirty-two centimeters in diameter. If the flat side of the semicircular element were parallel to the plane of the vessel rim, the panther would extend out at an angle slightly above that plane. The ram's head beneath the semicircular ele-



ment is concave on the inner, undecorated side and would only conform to a deeply curving neck or body.

It is not clear how the handle was attached to a vessel. There are no rivets or holes, which would indicate a mechanical join, nor is there visual evidence of solder on the back of the ram's head or along the edge of the semicircular element. The concave edge of the semicircular element is undercut and apparently would have been attached to the underside and edge of the rim.

The handle is composed of high-tin leaded bronze. Surface analysis by X-ray fluorescence can only roughly indicate the composition of a bronze of this type, given the inaccuracy caused by the corrosion layer and the significant presence of lead.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Copper | 72 |
| Tin | 21 |
| Lead | 7 |
| Iron | 0.2 |
| Silver | 0.05 |
| Antimony | 0.05 |

## Notes

1. Bahrami 1948, 288–92, figs. 1, 2 (reportedly found near Burujird; length 29.5 cm).

2. Muscarella 1974, no. 164.

3. Marshall 1951, 595–96, nos. 321, 322.

4. Moorey et al. 1981, 114, no. 659 (bronze rampant lion). Compare also a bronze leopard forepart in the Metropolitan Museum of Art, for which a Parthian date is suggested: Muscarella 1988, 296, no. 421.

# 9

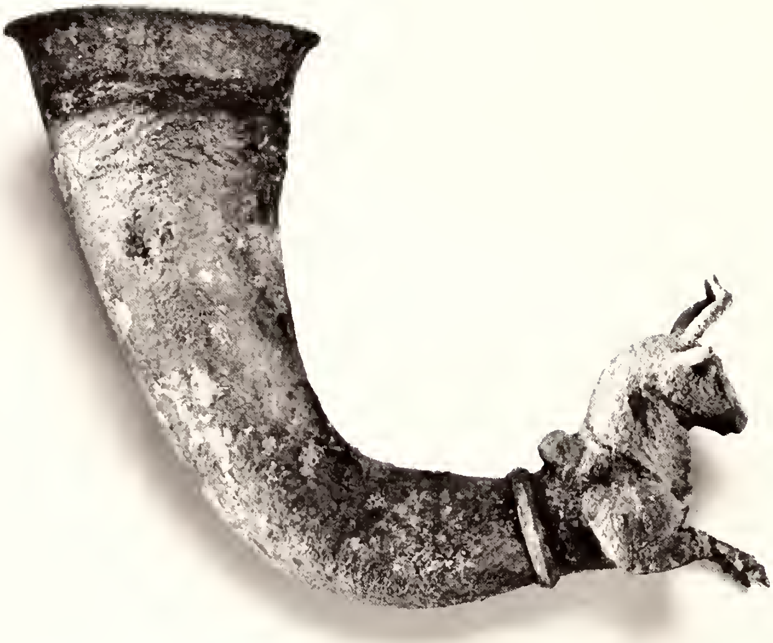
## *Horn rhyton*

1st century B.C.– 1st century A.D.
Silver and gilt: hammered, chased, gilded
Height 29.5 cm
Length 35.0 cm
Width 12.1 cm
Weight 1,195 g

Arthur M. Sackler Gallery, S1987.128
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1987, 43, fig. 9; Gunter 1988, 41, fig. 25.



A RING COVERS the join between the tall slender horn and the protome fashioned as the forepart of a humped bull. A band of foliate pattern executed in low relief encircles the upper circumference of the horn; a swirl pattern is visible on the shoulders of the bull. A tubular spout protrudes from the animal's chest. Traces of gilding are preserved on the horns.

At an earlier period in western Iran, the form of the humped bull or zebu, either entirely or in part, was often used to fashion a drinking vessel. Ceramic examples of this type, dating to the late second and early first millennium B.C., have been recovered from the region southwest of the Caspian Sea.[1] Among horn rhyta of the Parthian period, however, few display a bull protome.[2] A silver rhyton with zebu protome, very similar to [9], was acquired by the Toledo Museum of Art in 1988.[3]

### Technical Discussion

Two basic parts make up the rhyton, the horn and the protome. A ring covers the juncture between the two parts. The horns, ears, and legs of the protome are additional parts that were formed separately. The horns and ears are solid, while the legs are hollow for about half their length. (Material in the upper half of the legs appears to be solder from a modern repair.) A later addition, the rim extends the height of the horn about 3.5 centimeters.

Two decorative bands encircle the rim. A diamond pattern enclosed in bands is found on the inner surface of the added rim section. Thin lines, which appear engraved, make up the pattern. A second decorative band is present on the main body of the horn just under the added rim section. This band has a foliate pattern and stands in relief on the outer surface. Another raised decoration, comprising a vegetal motif, is present on the underside of the horn. Leaf gilding was applied to details of the protome, the raised decoration on the underside of the horn, and the raised decorative band near the rim. Swirl patterns are found on the shoulders of the bull protome, and these were made by chasing (fig. 1).

The state of repair of the rhyton almost defies description. The front side of the horn was broken into many pieces and reassembled. Radiography reveals that along the join lines of the various pieces are many gaps filled and painted to look like corrosion. Soft solder, used to make many of the joins, is also apparent. The sides and back of the horn suffered only a few cracks and detached pieces. The protome was also broken along the top where it joins the front of the horn. The legs appear to have broken away and been reattached using a radiographically opaque material, such as soft solder, on the interior. Nevertheless, the essential shape of the vessel appears to be correct with no unoriginal parts, except for the separate piece added to the rim. A band of silver was used to make the rim piece, and it has a vertical seam running just off-center down the back of the vessel (fig. 2). The horn is seamless up to this point. The added rim section also appears to be composed of ancient silver due to its condition, but its radiographic density is greater than and entirely inconsistent with that of the rest of the horn.

The surface is severely deteriorated. Only a few spots do not bear a thick silver chloride corrosion layer (horn silver). Bromine was also detected by X-ray fluorescence analysis, suggesting the presence of silver bromide corrosion as well.

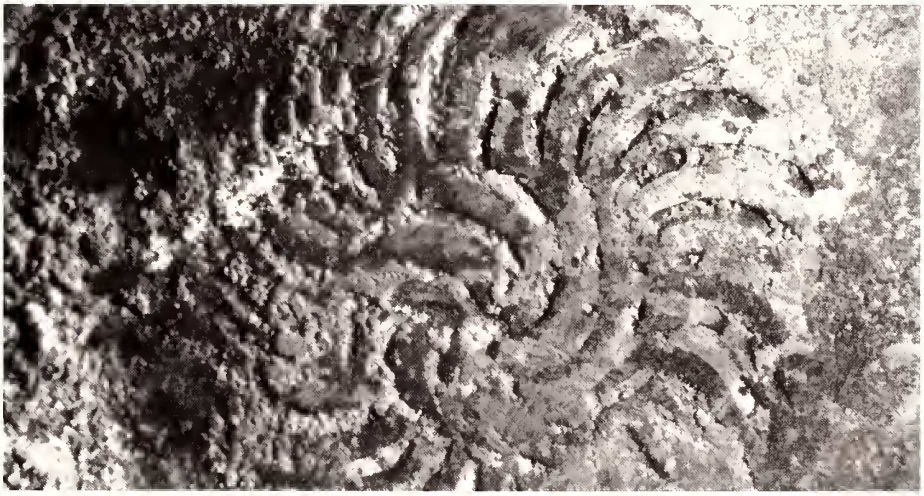


Fig. 1. Macrophotograph of the chased swirl pattern on the shoulder of the bull protome.

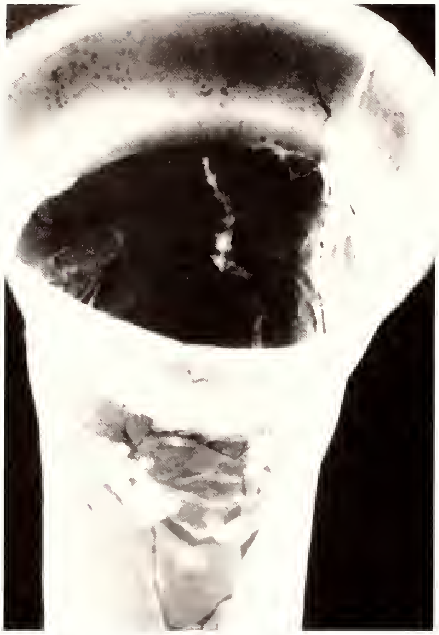


Fig. 2. Radiograph of the added rim section showing seams and differences in density between the horn and rim.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence:

| | Horn* | Protome** | Attached rim section** |
|---|---|---|---|
| | PERCENT | | |
| Silver | 96 | 92 | 96 |
| Copper | 2 | 5 | 2 |
| Gold | 0.7 | 1 | 1 |
| Lead | 0.7 | 1 | 0.3 |

* Average of three measurements.
** One measurement.

## Notes

1. Haerinck 1988 surveys the excavated material.

2. Masson and Pugačenkova 1982, 41, cite a clay rhyton with bull's head found at Merv and dated to the second to third century A.D.

3. Knudsen and Luckner 1991.

# 10

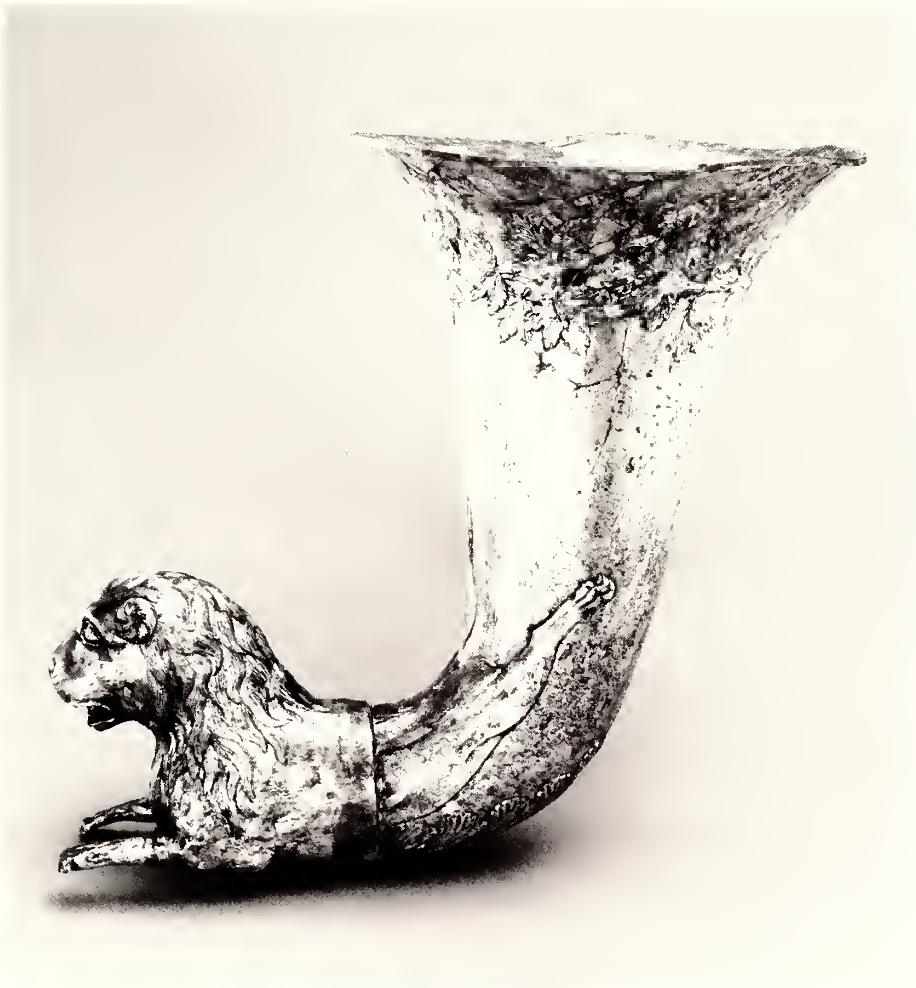
## *Horn rhyton*

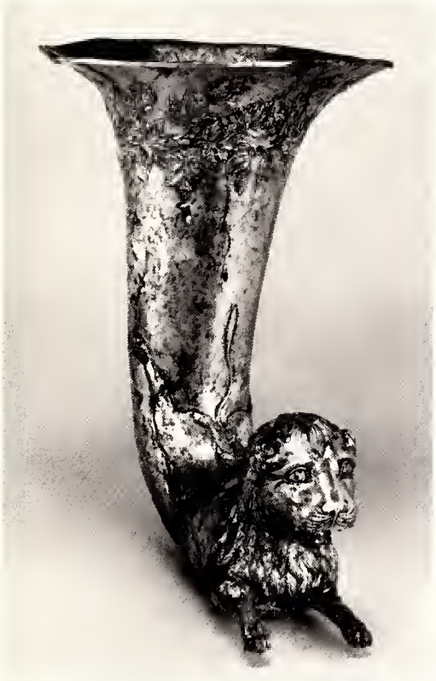
1st century B.C.–1st century A.D.
Silver and gilt: hammered, chased, gilded
Height 25.6 cm
Length 27.3 cm
Width 17.3 cm
Approx. weight 502 g

Arthur M. Sackler Gallery, s1987.130
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1987, 42, fig. 7; Lawton et al. 1987, 45, no. 18; Gunter 1988, 40, fig. 23.





THIS DRINKING VESSEL unites a lion protome with an elongated, trumpet-shaped horn. A gilded vine-leaf scroll encircles the upper part of the horn; a gilded acanthus-leaf pattern extends along the underside of the horn. The separately made protome is in the form of a lion; the lion's back, legs, and tail extend upward on the horn. Mane, paws, whiskers, tongue, eyebrows, and pupils are gilded. Small swirl patterns are found at the inner ends of the eyebrows and on the ear. A lock of mane extends to the center of the forehead. A spout protrudes from the animal's chest.

The form and decoration of this rhyton, particularly the extension of the body of the animal onto the horn, link it to Achaemenid and Greek versions dating from the fifth to the third century B.C.[1] The acanthus leaf on the underside of the horn is a feature that appears on Greek ceramic rhyta as early as the fourth century B.C. It is also shown on a rhyton with a feline protome depicted on silver cups in the Berthouville treasure, a Roman hoard dating to the first century A.D.[2] The acanthus leaf on the horn occurs on ivory rhyta of the first century

B.C. found at Nisa, the early Parthian capital located in modern Turkmenistan. A vine-leaf pattern also decorates the rim of several Nisa rhyta.[3]

A horn rhyton with lion protome occurs only rarely among Achaemenid and Parthian examples.[4] A lion protome from a rhyton made of ivory was found in the Oxus temple at the site of Takht-i Sangin in Central Asia; the vessel dates to the fifth or fourth century B.C.[5]

A virtually identical silver-gilt rhyton with lion protome is in the collection of Noriyoshi Horiuchi.[6]

## Technical Discussion

Two main parts comprise the vessel: the horn and the protome; the juncture is not covered by a band. Formed from a thin sheet of silver, as is the rest of the vessel, the legs were added separately. The thickness of the metal appears rather uniform, with the exception of the rim, which is slightly thickened and turned over along the edge. No seams are apparent on either the horn or the protome (with the exception of the junctures of the legs and the protome).

Raised details of the vessel appear to have been formed by a combination of raising, repoussé, and chasing, although the shape of the rhyton would probably require that most of the working be done on the outer surface. Leaf gilding highlights various parts of the chased details such as the vine-leaf motif near the rim, decoration on the underside of the horn, and mane, whiskers, tongue, eyebrows, pupils, and paws. The sharp, angular edges of the leaf can be seen in many places. X-ray fluorescence analysis of the leaf does not indicate the presence of mercury.

The rhyton has suffered extensive damage and subsequent repairs. While it appears essentially complete, some elements have been lost. The horn was broken into many pieces and reconstructed before its acquisition by the Sackler Gallery. A few small pieces of undecorated silver were used to fill missing areas near the rim. A band of new silver was added to the end of the protome to create a clean, strong juncture. The foreparts also suffered losses and were once detached. The proper right leg has been shortened in the restoration. It appears that a socket joint, with the end of the leg fitting over a hollow, tubular juncture on the body, was used to join the legs.

The metal shows the effects of fairly heavy corrosion. The surface is pitted and etched in many places. Trace amounts of bromine were detected by X-ray fluorescence, which may possibly be attributable to silver bromide corrosion.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence:

| | Horn * | Protome ** |
|---|---|---|
| | PERCENT | |
| Silver | 99 | 99 |
| Copper | 1 | 0.8 |
| Gold | 0.5 | 0.5 |
| Lead | bdl † | bdl |

* Average of two measurements.

** One measurement.

† Here and throughout "bdl" indicates "below detectable limit."

## Notes

1. Muscarella 1974, no. 177 (Achaemenid), no. 185 (fourth–third century B.C., allegedly from the region of Adana in southern Turkey). My thanks to Prudence Harper for this and the references in the two following notes. Another rhyton of Achaemenid date, from Erebuni in Armenia, is a horn rhyton incorporating an entire animal body (illustrated in Harper 1978, 30, fig. 1a).

2. Grift 1984, pl. 51, figs. 2, 3; pl. 52, fig. 7.

3. Masson and Pugačenkova 1982, pl. 12, fig. 1; pl. 19, fig. 2; pl. 107, fig. 8. For the vine-leaf scroll around the rim, see Masson and Pugačenkova 1982, pl. 107; pl. 108, figs. 1–3.

4. The Achaemenid gold rhyton allegedly from Hamadan, now in the Metropolitan Museum of Art, has a protome in the form of a winged lion: Wilkinson 1954–55, 221–22; acc. no. 54.3.3.

5. *Oxus* 1989, 34–35, no. 6.

6. Information kindly supplied by Pieter Meyers.

# 11

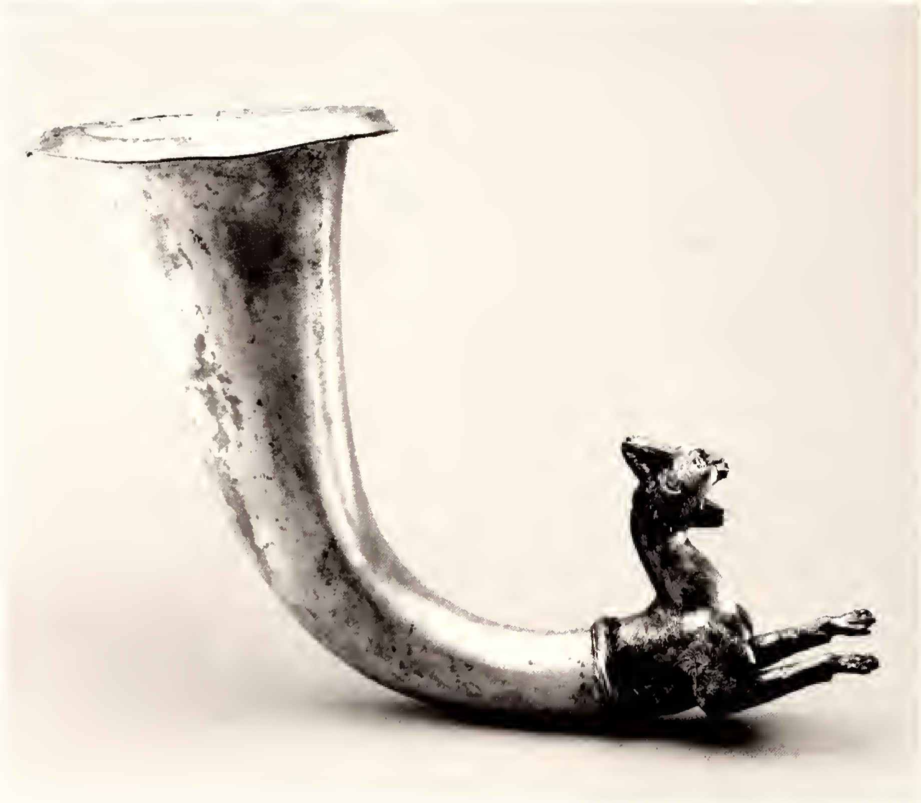
## *Horn rhyton*

1st century B.C.–1st century A.D.
Silver and gilt: hammered, cast, chased, punched, gilded
Inscribed on rim
Height 23.5 cm
Length 28.5 cm
Width 12.3 cm
Approx. weight 698 g

Arthur M. Sackler Gallery, S1987.131
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1987, 42, fig. 8; Lawton et al. 1987, 44, no. 17; Gunter 1988, 41, fig. 24.



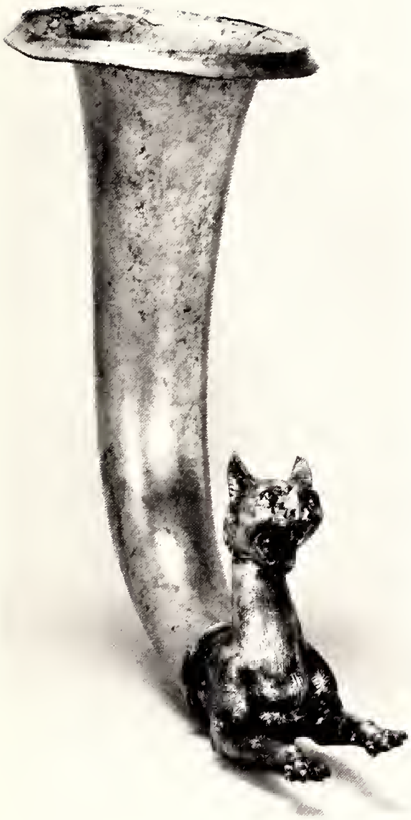
A SLENDER, STEEP horn rises to an outturned and folded-over rim; it is attached to a separately made protome modeled as the head and forepart of a lynx. A ring covers the join of the horn and protome. The forelegs of the animal were made separately and set into the body. A tubular spout projects from the chest of the animal, between the forelegs. The rim of the horn, turned over and gilded on the exterior, is inscribed.

The mouth of the lynx is open, the tongue protrudes; tufts of hair sprout from each ear. A swirl pattern marks the shoulders and the chest above the protruding tubular spout. A collar encircles the neck.

A Parthian inscription on the rim of the horn is only partly preserved but apparently names the owner and gives the weight of the vessel as 167 *drahm: MN ZWZYN 100 [+] 60 [+] 7.*[1]

Rhyta with feline protomes are depicted in Hellenistic and Roman art and identified as cult vessels closely associated with Dionysiac mysteries.[2] The pointed ears of the Sackler example suggest a Near Eastern, rather than a Western, origin for this particular example. A silver-gilt horn rhyton with panther protome, of similar proportions and appearance, is in the Metropolitan Museum of Art, New York; the shoulders of the animal are decorated with a grapevine pattern. The Metropolitan rhyton has been assigned to a Near Eastern workshop and dated to the Parthian period.[3] A pair of lynx rhyta, inscribed on the rim in

Aramaic with a personal name (probably the owner) and the weight of the vessel, is in the J. Paul Getty Museum, Malibu, California.[4]



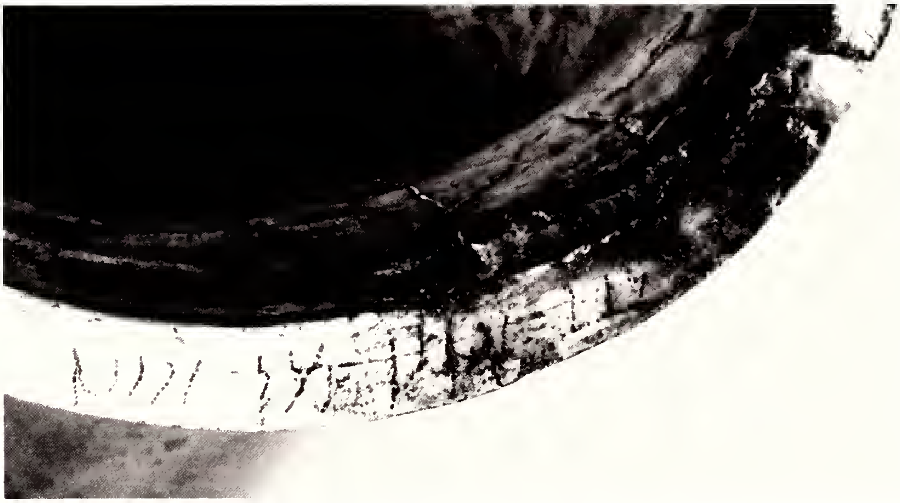
## Technical Discussion

The rhyton is composed of three basic parts: the horn, the protome, and the ring covering the juncture between the other two parts. The protome, however, is a multipart construction.

The horn appears under microscopic and radiographic examination to be of seamless construction. The radiographic image of the horn is very mottled, indicating that it was formed by hammering. That the horn was raised is confirmed by metallographic examination of a sample taken from the rim; a worked and annealed structure is apparent, with no evidence of a cast structure.

The protome is hollow and compared to the horn is very thin-walled, except for the legs, which are solid and apparently cast. It is difficult to understand how such an elaborate protome could be created from a single sheet of metal by hammering and without seams, yet this is what is indicated by radiography. The legs are joined to the protome with a socket joint. At their juncture, the legs narrow and fit into a socket formed at the base of the legs on the protome.

Details were chased. Small oval punch marks create the effect of fur on the protome. The inscription on the rim was formed using small circular punch marks. Gilding covers the top surface of the everted rim and the entire protome. Metallographic and microscopic examination reveals features common to leaf gilding. Electron-microprobe analysis of the metallographic section indicates the presence of a small amount of mercury, but it appears to be in the gold leaf and not at the interface between the gold and the silver, thus it does not seem that mercury was used to adhere the leaf. Whether the leaf was



adhered mechanically or with the addition of heat is unclear. The surface of the silver was not scored to provide better adherence. An unusual feature of the rhyton is that the head is filled with cinnabar granules.

When the rhyton was acquired, the shape of the horn was distorted and the rim was bent. Some losses had also occurred around the rim. The horn was reshaped and the losses were backed with silver foil so that they would be less obtrusive. When the vessel was cleaned, it was noticed that some areas presumed to be tarnish were much more resistant to removal than other areas on the protome. It thus seemed possible that these areas were spots of intentional patina, applied to imitate the spots on the coat of a lynx. A similar effect is found on works of Roman silver.[5]

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence:

| | Horn* | Band** |
|---|---|---|
| | PERCENT | |
| Silver | 99 | 97 |
| Copper | 0.4 | 1 |
| Gold | 0.7 | 0.6 |
| Lead | bdl | 0.7 |

The protome was not analyzed due to the extent of gilding.

* Average of two measurements.

** One measurement.

### Notes

1. Philippe Gignoux provided this reading and translation, based on a photograph of the inscription.

2. Tuchelt 1962, 113–14. Prudence Harper kindly steered me toward the following references: Grift 1984, pls. 51, 52; also Masson and Pugačenkova 1982, 39, fig. 7.

3. *Bulletin of the Metropolitan Museum of Art* (Spring 1984): 16, fig. 13.

4. "Acquisitions/1986" 1987, 164–65, no. 21 (dated first century B.C.).

5. Bothmer 1984, 55.

# 12

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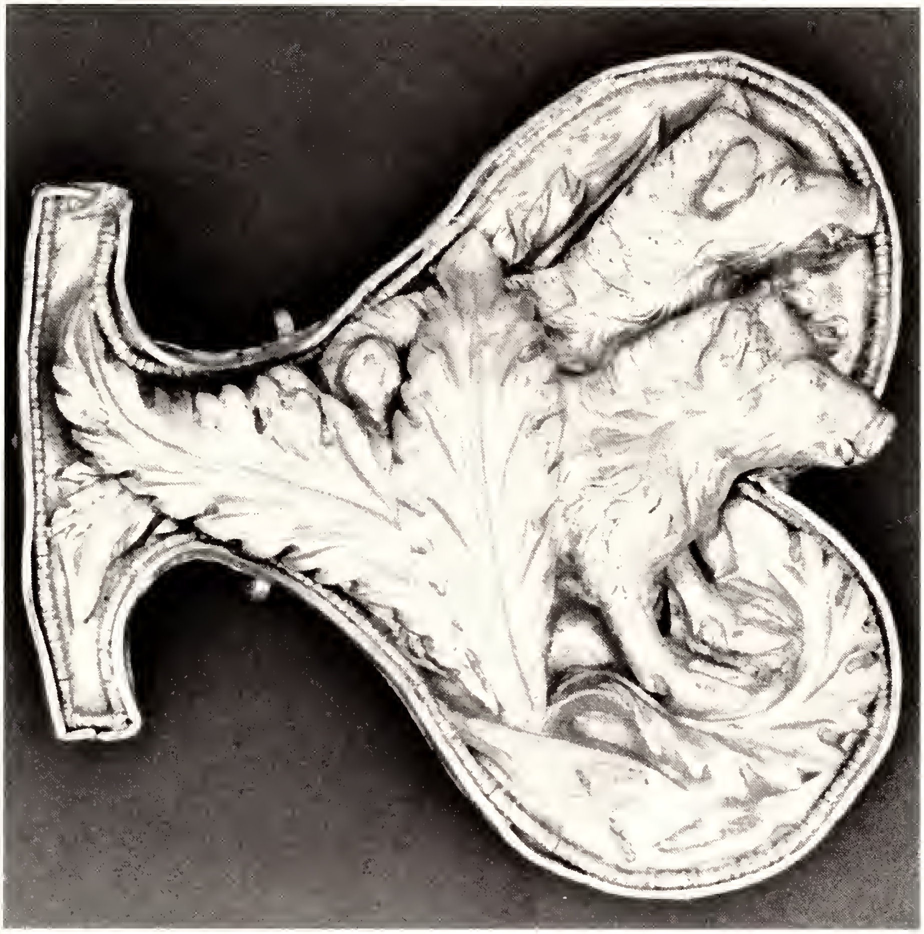
## *Heart-shaped ornament*

2d century B.C.–2d century A.D.
Gold: repoussé, chased, traced
Length 5.3 cm
Height 1 cm
Width 5 cm
Weight 33 g

Freer Gallery of Art, 61.22
Purchased from K. Rabenou, 1961

*Exhibited:* Freer Gallery of Art, from 1962.

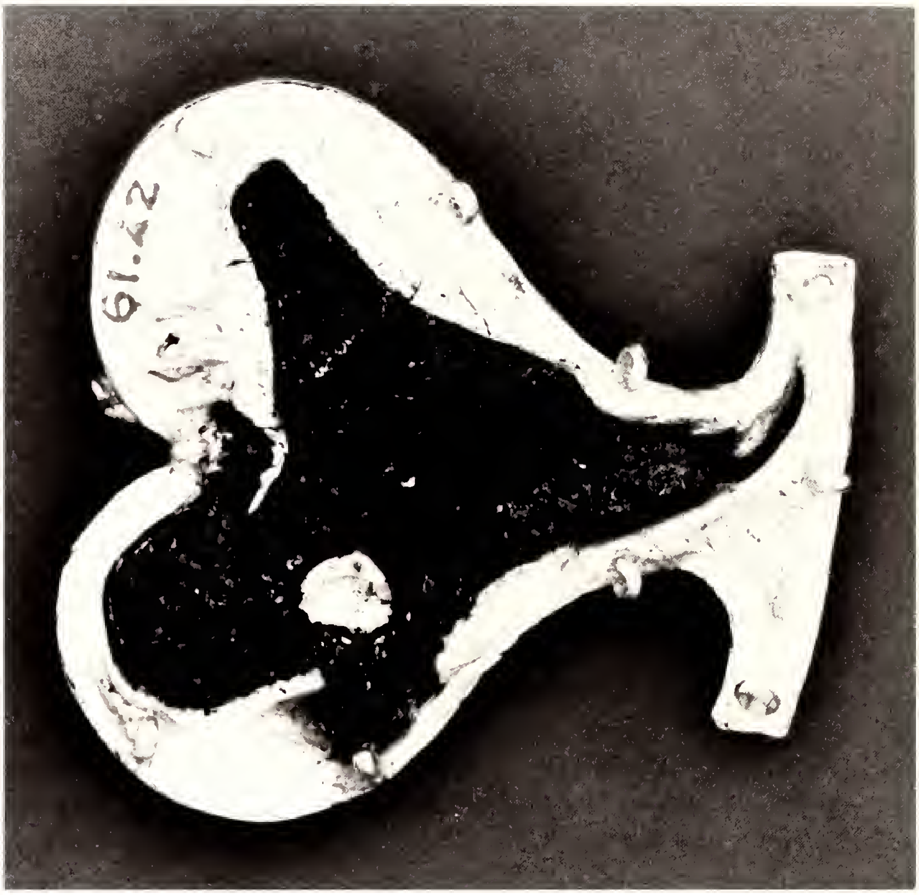
*Published:* Atıl 1971, no. 42.



TWO BOARS EMERGING from a thicket of leaves decorate this heart-shaped gold ornament. The foreparts of the animals are modeled in high relief; the heads are modeled almost in the round. On the reverse are ten small loops spaced evenly along the edges.

This unusual ornament was allegedly found in Iran together with a silver bowl decorated with acanthus and rinceau designs, probably of Seleucid or Parthian date.[1] The attachment loops on the reverse suggest that it was used as a clothing appliqué. The closest parallel for the type and form of the Freer object is a gold plaque found in the Oxus treasure. Although smaller and lacking figural decoration, it preserves four small loops for attachment on the reverse.[2] The Oxus plaque can be dated sometime between the fourth and second centuries B.C.

Closer in style to the figural decoration on the Freer plaque is a gold belt buckle with animal decoration from a hoard of Parthian metalwork published by Ernst Herzfeld in 1928. The hoard was reportedly found in the village of Nihavend in western Iran.[3] Another source of comparative material has emerged more recently among the luxury objects recovered from the rich burials of the Tillya-Tepe necropolis near Shibarghan in Afghanistan, dating



from the first century A.D. Among the gold ornaments thus far recovered are a number of openwork plaques with animal or human figures rendered in three-quarter view, in a sculptural style closely akin to that of the Freer ornament. Several examples have loops for attachment on the reverse; others are belt ornaments. As a group, many of the Tillya-Tepe objects are distinguished by their polychrome effect achieved by stone inlay, a technique not employed on the Freer gold plaque.[4] Despite this difference, the Freer plaque may illustrate a related school of metalwork of the Parthian era, one perhaps centered in eastern Iran or in Bactria.

## Technical Discussion

The ornament is a multipart construction comprising sheet gold and wire. The complex design with its overlapping forms suggests casting as the method of manufacture, yet the extremely thin sheet and projecting edges on the back indicate a sophisticated use of chasing and repoussé. The purity of the gold provides great malleability, and this quality was exploited to its utmost by the artisan. The boars' heads and leaf forms in high relief appear to have been compressed over the background to create an overlapping effect. Radiographs reveal the thinness of the metal. The hollows on the back of the ornament are filled with a bituminous material that prohibits examination of the metal. Were such an analysis possible, one might be better able to understand the forming methods used. As it is, one can only rely on the few obvious toolmarks; most of the microscopic surface details have been muted over time by wear and subsequent cleaning. Some toolmarks indicate that chasing was used to create the finer details of the boars' heads and coats. The details of the leaf forms appear to have been traced rather than made with punches. Two elements are added along the border of the ornament. The outer element is a flat band or strip of metal soldered to the edge; inside the band is a length of beaded wire with a pattern that is repeated at 2.5 millimeter intervals.

In addition to the bituminous fill material on the back of the ornament, ten small loops are spaced roughly equidistant from one another along the edge. The loops are about 2 to 3 millimeters in diameter, are hemispherical in cross section, and are soldered to the backplate. Hard solder was used, and X-ray fluorescence analysis of the solder does not indicate the presence of cadmium, which would suggest a solder of recent origin.

The surface bears evidence of age in the random wear and scratches that are present. A few millimeters of the edge band and beaded wire are lost. Acidic solutions were used at one time to clean the ornament and remove earth encrustations, which may account for the slight etching found in many areas on the surface.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Gold | 99 |
| Silver | 0.5 |
| Copper | 0.8 |

## Notes

1. Freer Gallery of Art registrar's object files (61.22); the location of the bowl is not given.

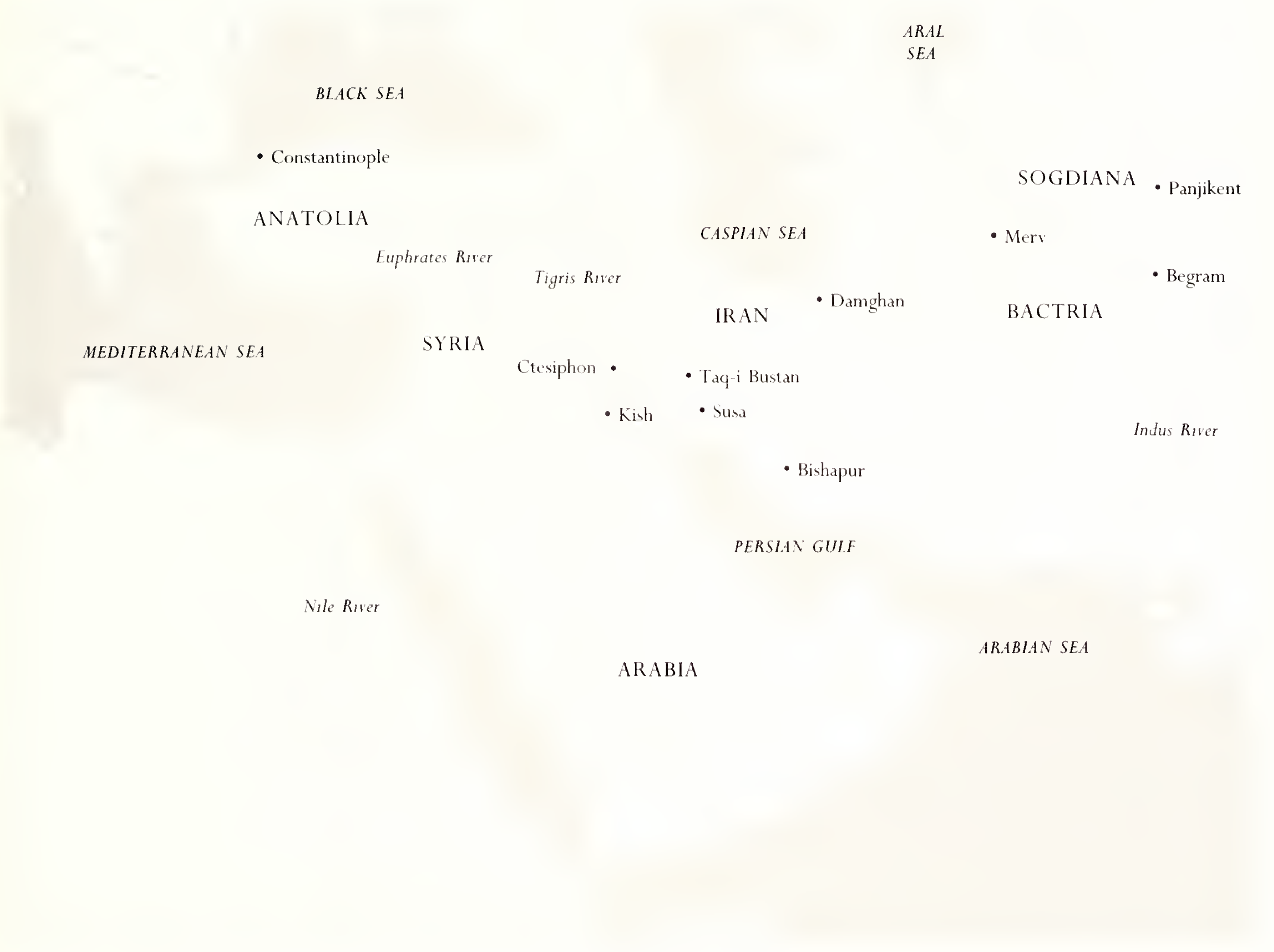
2. Dalton 1964, 40, no. 160, pl. XXI. Mitchell 1989 provides a recent discussion of the treasure and its date.

3. Pope 1964–65, 2: 465, 7: pl. 138B; also Tait 1986, 90, no. 197, with bibliography. A mate to the London buckle, from the collection of J. Pierpont Morgan, is now in the Metropolitan Museum of Art (Pope 1964–65, 7: pl. 138A). For the Nihavend hoard, see Oliver 1977, 72–76, with bibliography.

4. Sarianidi 1985, esp. pls. 48–50, 77–79, 88–97, 124; 53–54, for discussion of the different metalwork styles.

# *Sasanian Period*

## *Circa* A.D. 224–651



# 13

## Plate

4th century A.D.
Silver and gilt: hammered, cast, chased, engraved, gilded; with added decoration
Height 4.7 cm
Rim diameter 24.0 cm
Weight 870 g

Freer Gallery of Art, 34.23
Purchased from Hagop Kevorkian, 1934
Found at Weirano, Perm Oblast, Russia, 1872
Formerly in the Stroganov collection

*Exhibited:* Freer Gallery of Art, from 1935.

*Published, selected:* Smirnov 1909, 6, 14, pl. XXIX, no. 57; Erdmann 1936, 202, with bibliography; Chase 1968, 78–85; Atıl 1971, no. 51; Harper and Meyers 1981, 61–63, 127, 171; Herrmann 1989, 761.

A GILDED BAND encircles the interior rim of this plate with a low ring foot. Separately made and attached figures in high relief, gilded, on silver ground, decorate most of the interior. The face, neck, and hands of the king have been left ungilded.

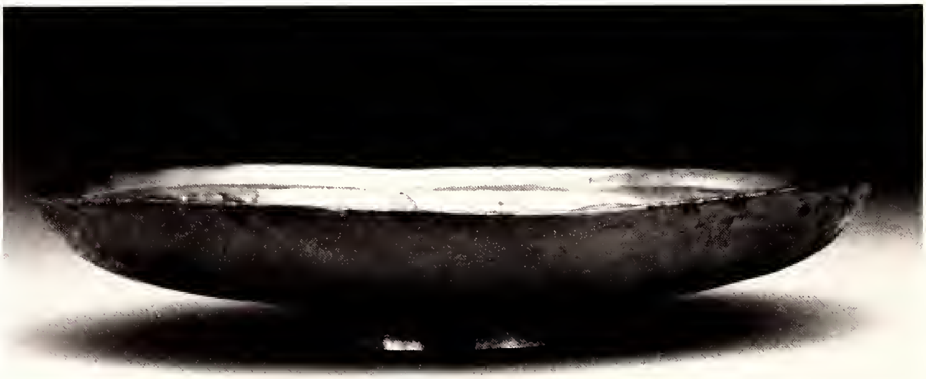
The interior scene consists of a royal figure hunting boars with bow and arrow while mounted on a charging horse moving to the right. One animal flees to the right; a second animal, wounded, stumbles beneath the horse.

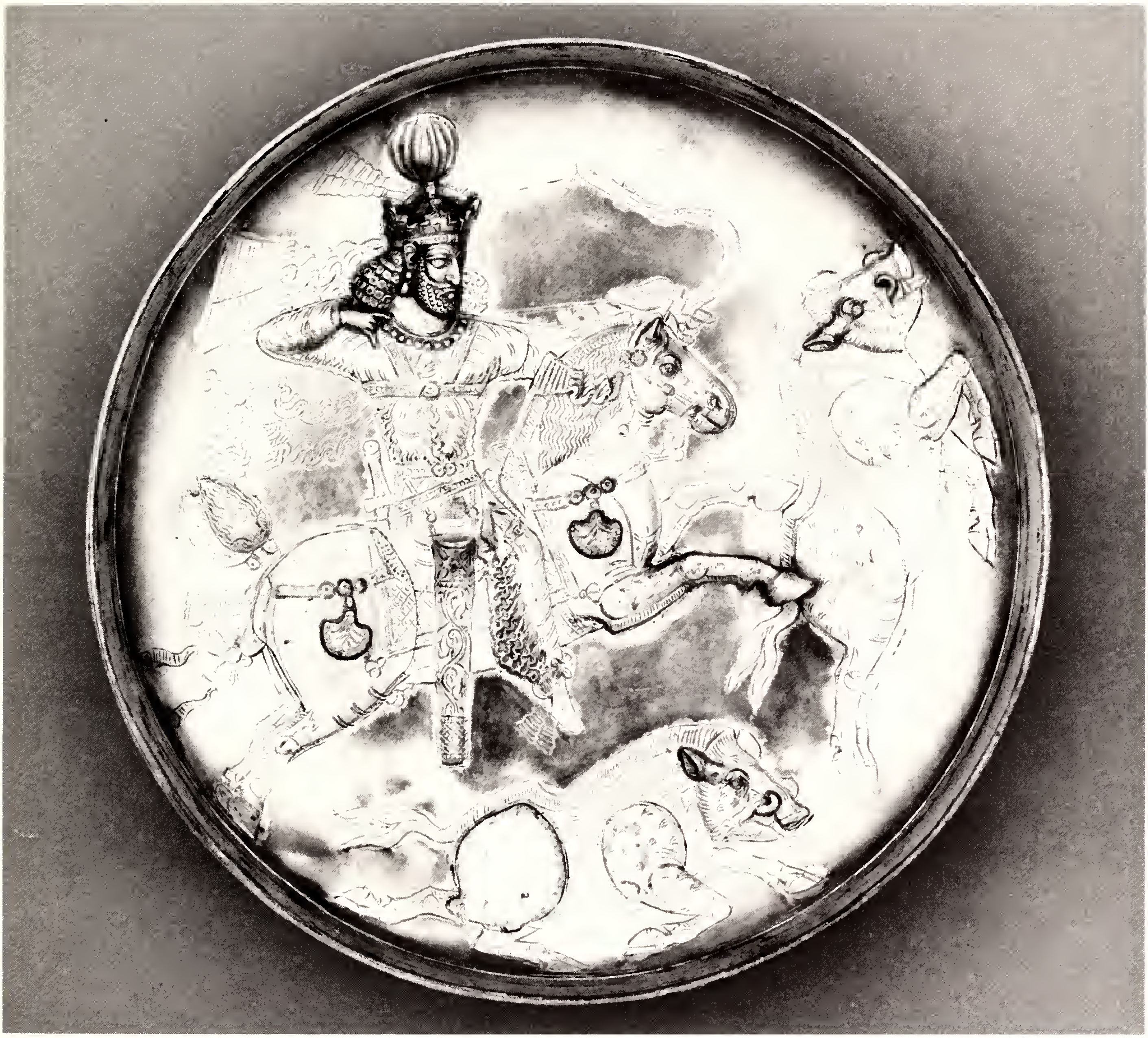
The head of the king, shown in three-quarter view, is modeled in high relief. He wears a beaded diadem with streamers and a crenelated crown topped by a vertically striated globe, from which streamers (ungilded?) are tied. His curled hair is pulled together in a ball at the back of the head, and his beard is short. He wears a long-sleeved tunic and full trousers gathered at the calf. The tunic has a beaded border at the neck and is belted at the waist; over it is a beaded halter with streamers fluttering to the left. The shoes are tied with ribbons. The earring consists of a bead and an oval pendant. The hilt of the sword is shown above the horse's back. The quiver case, suspended from the king's belt, is divided into three registers; the short, uppermost register and the tall, central register are decorated with curvilinear patterns, the lowermost register is crosshatched.

The horse moves in a flying gallop, the right foreleg modeled entirely in relief. Three flamelike tufts emerge from the crenelated mane. A dotted lozenge pattern decorates the saddle blanket; palmettes hang from the harness bands. Streamers flutter from the head harness, back harness, and tail.

The solid-cast foreleg of the horse overlaps the boar in the field to the right. The boar runs with front legs bent and rear legs outstretched. A second boar, wounded by an arrow in the right shoulder, stumbles beneath the horse. The left foreleg is partly extended, the right foreleg is bent under, the left rear leg is extended on the ground, and the right rear leg is outstretched.

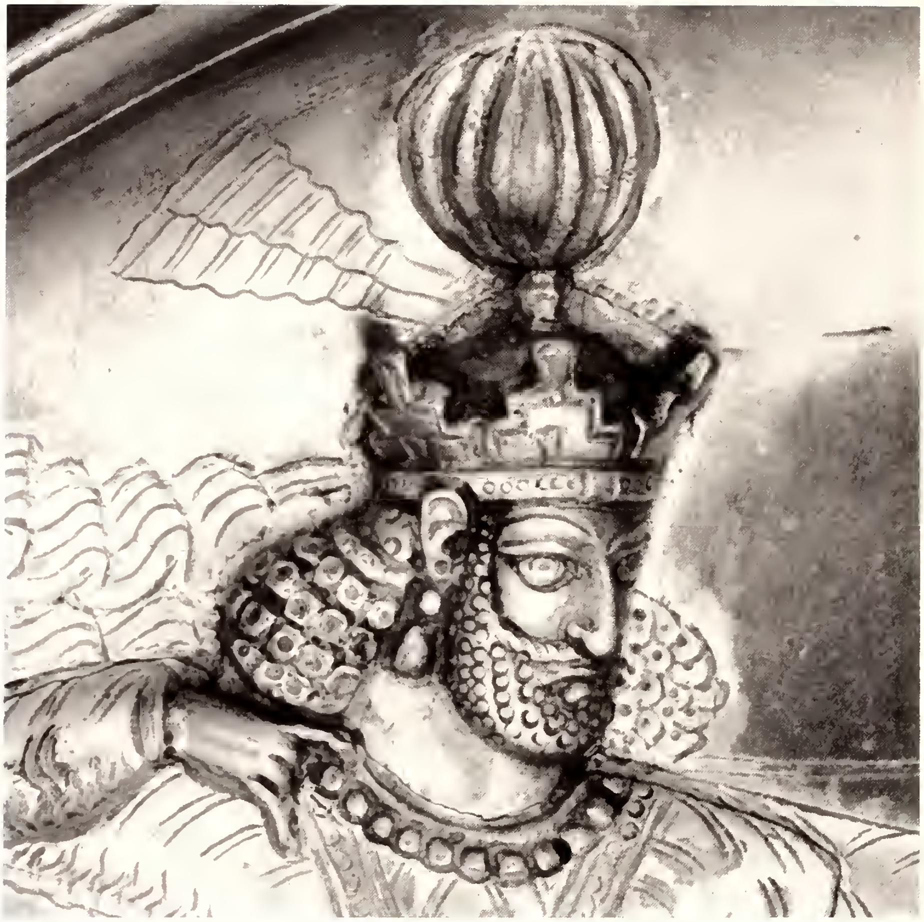
Probably the best-known work of ancient Iranian metalwork in the Freer collection, the Stroganov or Shapur plate has been frequently reproduced as a splendid illustration of the Sasanian royal hunting plate. Formerly in the collection of Count Stroganov in Saint Petersburg, the plate was first published in





1909 by I. I. Smirnov in a volume devoted to oriental silver.[1] Acquired by the Freer Gallery of Art in 1934, the Stroganov plate was perhaps the earliest example of Sasanian silver from a Russian collection to reach the United States.[2] It was also one of the first Sasanian silver vessels to receive a detailed technical examination.[3]

Most discussions of the plate have focused on the royal figure, using the evidence of the crown type to establish his identity. In his 1909 publication Smirnov identified the figure as the Sasanian king Shapur II (r. A.D. 309–79), based on a comparison of the crown with one depicted on coins of that ruler.



Yet the innovation in royal headgear that appears on the plate—the striated globe—does not occur on royal images known from Sasanian coins. The identity of the royal figure on the Freer plate cannot, therefore, be established through numismatic comparisons. The striated globe occurs among royal representations on Sasanian rock reliefs and on a lifesize silver head in the Metropolitan Museum of Art, New York, which Prudence Harper has identified as a portrait of Shapur II on the basis of comparisons with the Taq-i Bustan investiture relief depicting the ruler.[4] Precisely what the striated globe was intended to represent has not yet been determined. Ernst Herzfeld suggested that the striated globe formed part of battle dress, a feature of royal headgear associated with helmets rather than royal crowns. The striated globe is also found on some of the royal crowns depicted on Kushano-Sasanian coins; most scholars, however, would opt for a Sasanian origin of the feature and a later, Kushano-Sasanian imitation. Among Sasanian royal hunting plates, the striated globe occurs only on three other examples: the Metropolitan plate depicting a royal figure identified as the Sasanian king Yazdgard I (r. A.D. 399–421); a plate in the Hermitage Museum, Saint Petersburg, depicting a hunter wearing a ram's horn headdress; and a second hunting plate in the Freer Gallery [14].[5]

Three other hunting plates depict royal figures that have often been identified as Shapur II. Two are in the Hermitage Museum, Saint Petersburg; one was part of a treasure recovered at Pereshchepina, north of the Black Sea, and the other was found at Touroucheva, west of Perm. The Pereshchepina plate is damaged, and the royal headdress is incompletely preserved; for that reason it is not certain that Shapur's headgear was originally represented. Moreover, a halo encircles the head, a feature that does not otherwise appear on identifiable kings on Sasanian silver vessels until the reign of Yazdgard I.[6] Features linking the Pereshchepina and Freer Shapur plates are the composition, the high-relief modeling of the head, and some details of dress and ornaments. But the figure on the Pereshchepina plate does not wear a beaded halter, a feature of royal dress that became standard in representations beginning with Shapur II.[7] The figure on the Touroucheva plate wears a crown of Shapur II attested on coins, but the style of the figure, drapery, and animals departs significantly from Sasanian representations. Harper has suggested that the work is a provincial, eastern product of the fourth century, dating to the reign of Shapur II.[8]

A third plate depicting a royal hunter frequently identified as Shapur II is a small silver-gilt dish showing the king on a stag.[9] It is in the British Museum, London, and was purchased in Iran, with an alleged source in Asia Minor. The plate is highly unusual among royal hunting plates. It is smaller and deeper than most examples, and the hunter is depicted—exceptionally—sitting astride a stag, grasping its horns with his left hand and with his right plunging a sword into the animal's neck. A second stag, perhaps already dead, appears beneath the king and his mount. A fourth-century date for the British Museum Shapur plate has been argued by Harper and Meyers on stylistic and technical grounds. Since the hunter wears a crown of Shapur I (r. A.D. 241–72), the plate would then be interpreted as an intentional representation of that ruler made during the reign of Shapur II.[10]

Harper has classified the Freer Shapur plate with a group of royal hunting plates depicting Sasanian kings wearing crowns closely resembling those known from coins and rock reliefs. This group includes the British Museum Shapur plate, the Cleveland Hormizd plate, the Metropolitan Yazdgard I and Peroz-Kavad I plates, the Ufa plate, the Strelka plate, the Berlin plate, and the Anikovska plate. The group also adheres closely to a standard composition, in which the quarry, usually two animals, is always of the same species.[11]

The Freer Shapur plate is the only one of the central Sasanian group of royal hunting plates to depict a boar as the hunter's sole quarry. Varaz, "boar," was the name of a powerful family in the eastern part of the Sasanian realm, and Harper has suggested that the boars depicted on the Freer Shapur plate may have symbolized attacks on eastern enemies or regions.[12] The eastern source of several other hunting plates depicting boar as the sole quarry might be thought to support this interpretation. One of these, a plate recovered from the Perm region, depicts a hunter wearing a ram's horn headdress. The linear style of the hunter's drapery links the plate to early Sasanian silver vessels bearing medallions enclosing portraits or busts, and the elemental composition of the silver also distinguishes the vessel from the central Sasanian group. Harper has suggested that the plate is a product of an eastern, fourth-century workshop.[13] Two additional plates are also attributed by Harper to a fourth-century, eastern workshop, perhaps located in the vicinity of Merv in Turkmenistan.[14] The fourth plate depicting boar as the sole quarry is an engraved and spot-gilded vessel, now in the Hermitage; on both iconographic and stylistic grounds it probably belongs late in the Sasanian period.[15] In addition to these four plates, two hunting plates picture a boar along with two other animals of different species as the royal hunter's quarry. Both these plates depict a royal figure wearing an identifiable Sasanian crown but diverge in iconography, style, and elemental composition from those of the central Sasanian group of silver-gilt hunting plates.[16]

The Freer Shapur plate displays several new iconographic or stylistic features that subsequently became standard in the representation of the royal hunter in Sasanian silver plate. The first was the beaded halter. Another innovation was the rendering of drapery in a paired-line style, which became the style most commonly employed in the decoration of Sasanian silver vessels. The source of this drapery representation has been discussed by several authors, most of whom would place it in northern India as a Gandharan or Kushan trait.[17]

## Technical Discussion

This plate is one of the best examples of its type. It has been the subject of extensive technical study, and a similar plate in the collection of the Cleveland Museum of Art has also been described in great detail, both physically and metallographically.[18] From these studies, we now have a very thorough picture of how these vessels were made.

Each plate is composed of many separate pieces, which were formed individually and then added to the main body of the vessel. The essential features of the construction of a plate are as follows: The body of the plate was first hammered to shape. Then, an outline of the design was probably made. Low-relief forms, for example, the bow and forelegs of the boars on the Freer plate, were made by hammering and cutting away the surrounding area of the plate. The relief appears greater due to the use of a chiseled outline along the border. The areas to receive inserted pieces were prepared by raising a lip around the edge of the outline and chiseling away the underlying metal slightly. Once the pieces to be inlaid were made, either by casting or repoussé techniques, they were set into the outlines and the raised lip was crimped over the edge of the insert and

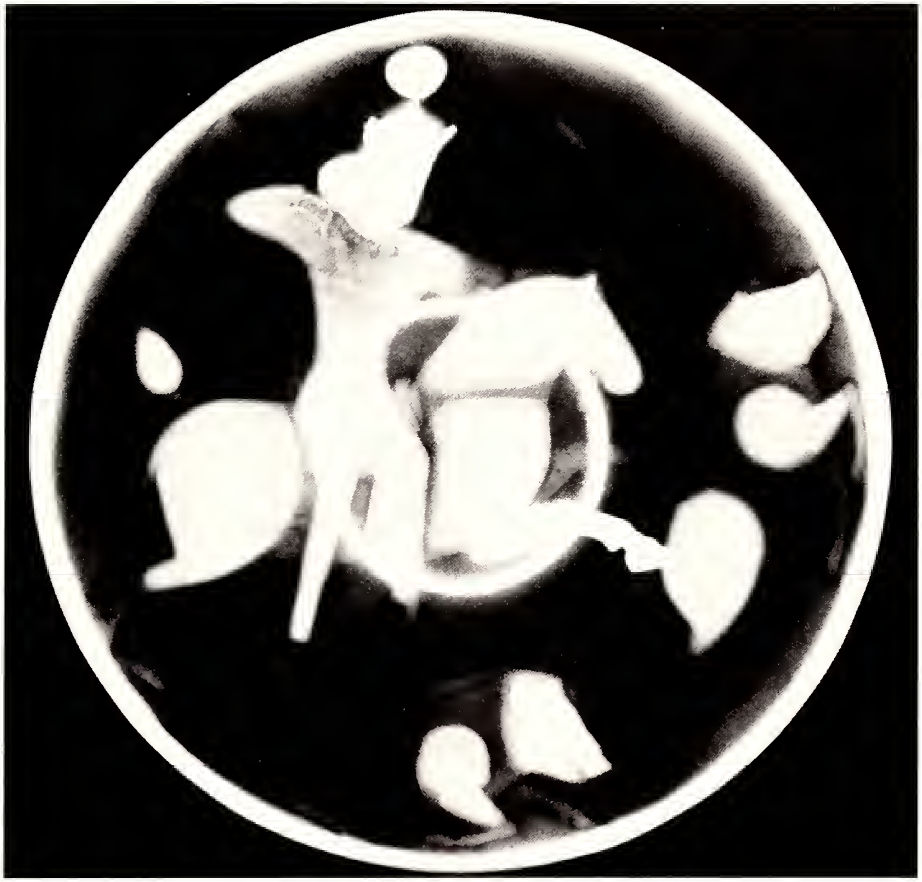


Fig. 1. Radiograph displaying cast and added parts.

scraped down. Further details were then added using chasing and engraving. When the shaping of the decorative front surface of the plate was completed, the ring foot was soldered onto the outer surface and the design areas were selectively gilded by amalgam gilding.

Nineteen separate pieces make up the Freer Shapur plate. Radiographs indicate that the head of the king and proper right foreleg of the horse were hollow cast and that the other inserted pieces were raised (fig. 1). It seems probable that the chased decorations on the inserted pieces were added before their attachment to the body of the plate, particularly on the thinner parts formed by repoussé that might be deformed by chasing without a backing. It is also clear, however, that much of the chasing was done after their application because in many areas the chasing runs over the junctures between the applied pieces and the body.

In the examination of the Cleveland Museum plate it was noted that the area along the outline of the inserted pieces and the relief areas of the design were cut away.[19] This same feature is found on the Freer plate. Also there is no cutting away of metal along the border of the inserted pieces where the border meets adjacent gilded design areas; it is only along the outer perimeter of the design elements that a chiseled outline is apparent. The outline was intended to prevent the gold amalgam from running over the body of the plate during the heating phase of the gilding process. Although it is a common feature of these plates that the gilding runs beyond the design areas, without the chiseled border the overflow of the gilding would have been greater.

The condition of the plate is excellent with the only major exception being the loss of the inset rear haunch of the lower boar. Also of note is the presence of a European hallmark on the outside surface near the rim.[20]

## Composition

As determined by neutron activation analysis:

| | Plate | Foot | Crown |
|---|---|---|---|
| | PERCENT | | |
| Silver | 94.3 | 94.4 | 94.9 |
| Copper | 5.10 | 4.90 | 4.50 |
| Gold | 0.550 | 0.691 | 0.556 |
| | PARTS PER MILLION | | |
| Iridium | 0.14 | 0.082 | 0.11 |
| Zinc | 29 | 32 | 11 |
| Tin | <32 | <40 | <17 |
| Arsenic | 11 | 13 | 9.5 |
| Antimony | 3.8 | 3.8 | 1.3 |
| Selenium | 1.6 | 7.5 | 4.7 |
| Iron | 58 | 28 | <2.9 |
| Cobalt | 1.2 | 0.89 | 0.056 |
| Mercury | 0.082 | 0.52 | 4.1 |
| Chromium | 0.67 | 0.21 | 0.16 |
| Scandium | <0.0018 | <0.0019 | <0.0019 |

## Notes

1. Smirnov 1909, 6, 14, pl. XXIX, no. 57.

2. See this volume, p. 14, for the early history of Sasanian metalwork in North American collections.

3. Chase 1968, 78–85. A technical examination of the plate made subsequently by Pieter Meyers was published in Harper and Meyers 1981, 171, no. 15.

4. Harper and Meyers 1981, 61–62, with additional references; also Harper 1966, 141–42.

5. Harper and Meyers 1981, pls. 16, 23. For reference to the Kushano-Sasanian coins: Harper and Meyers 1981, 61–62, with bibliography.

6. Harper and Meyers 1981, 60 n. 103, 98 n. 242.

7. Harper and Meyers 1981, 82.

8. Harper and Meyers 1981, 197.

9. Harper and Meyers 1981, 57–60, 58 n. 95, lists previous identifications of the figure as Shapur II.

10. Harper and Meyers 1981, 57–60, 170, no. 13. According to Harper and Meyers, the Cleveland Hormizd plate is

another example of a plate manufactured later than the figure it depicts (Harper and Meyers 1981, 60–61).

11. Harper and Meyers 1981, 57–72.

12. Harper and Meyers 1981, 139 with nn. 55–56. Best-known among boar-hunting scenes in Sasanian art are the reliefs in the grotto at Taq-i Bustan: Fukai and Horiuchi 1969, pls. XLIV–XLVI, LV–LVI, LVIII, LX. For the boar as a subject in stucco decoration, see Kröger 1982, 59–60, 177, 201.

13. Harper and Meyers 1981, 72–73, 133–34, pl. 23.

14. Prudence Harper in Bothmer 1990, 58–59, no. 43. The second plate was recovered in 1981 from the tomb of a military official named Feng Hetu (A.D. 483–501); the tomb was located west of Datong, Shanxi Province. A detailed discussion of this plate is found in Harper 1990.

15. Harper and Meyers 1981, pl. 32.

16. Harper and Meyers 1981, 68–72, pls. 20, 22.

17. Harper and Meyers 1981, 89–98, citing earlier literature. Note especially the discussion by Ingholt 1957, 39.

18. Chase 1968; Harper and Meyers 1981, 171; Gibbons et al. 1979, 163–76.

19. Gibbons et al. 1979, 163–76.

20. Chase 1968, pl. 2, fig. 5.

# 14

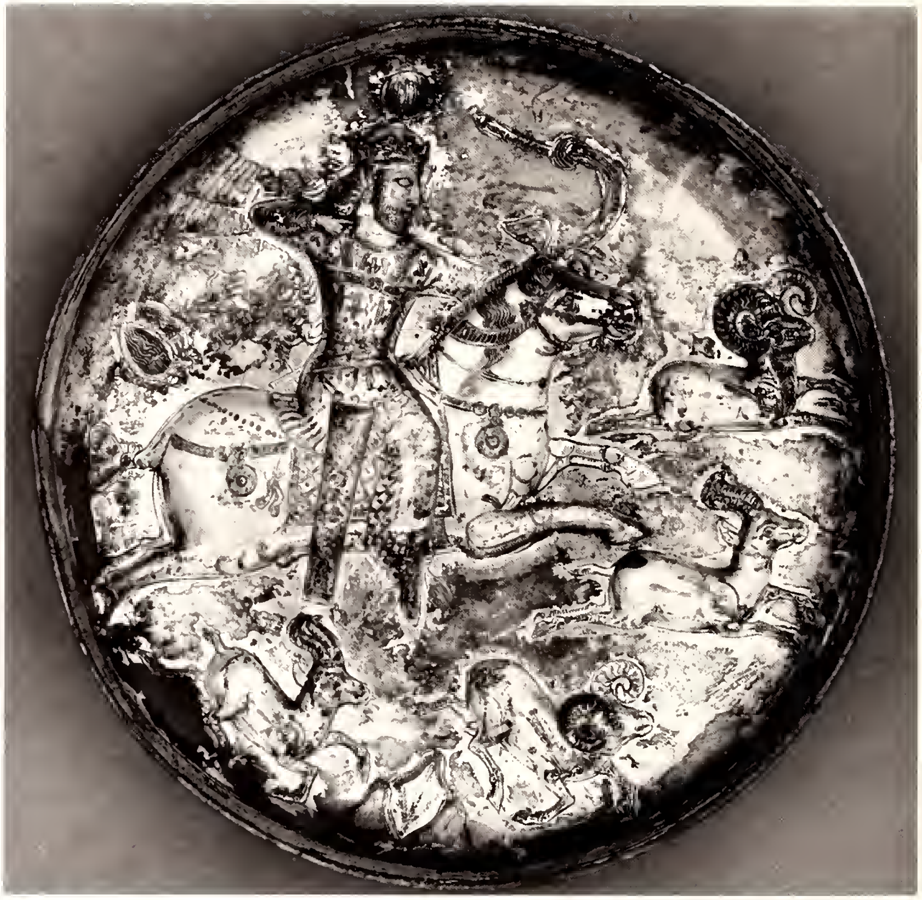
## *Plate*

4th–5th century A.D.
Silver and gilt: hammered, repoussé, carved, chased, incised, gilded; with added decoration
Height 2.4 cm
Rim diameter 19.1 cm
Weight 598 g

Freer Gallery of Art, 62.1
Purchased from A. Rabenou, 1962

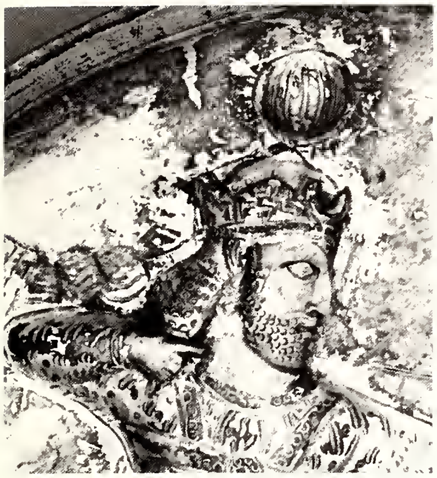
*Exhibited:* Freer Gallery of Art, from 1963.

*Published:* Shepherd 1964, 77, fig. 15F; *Kokka* 892 (July 1966): 17.



THE PLATE RESTS on a low ring foot. Parts of the decoration are gilded, and a gilded band encircles the interior rim. On the exterior is a chased line around the circumference, just below the rim.

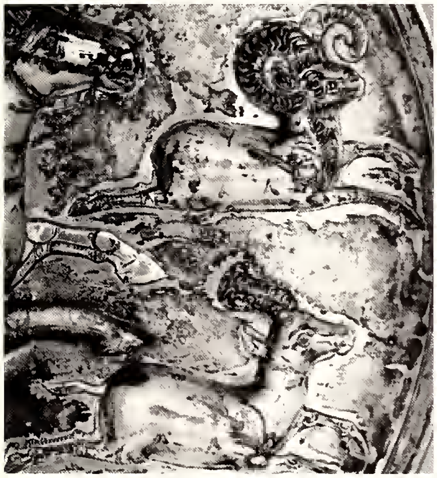
In the interior in high relief is a royal figure on horseback facing right, entirely gilded except for face, neck, beard, and hands; with drawn bow he hunts a pair of ibex and a pair of gazelle. He wears a mural crown with central crescent, surmounted by a vertically striated globe; there is a beaded band below the crown, and streamers from the diadem flutter to the figure's left.



He wears a tunic and trousers, in paired-line drapery style; over the tunic is a beaded halter tied in back with ribbons that flutter to the left. His belt is fastened in front. His quiver case, suspended in front, is decorated. The hilt of his sword is visible to his left.

The horse has a crenelated mane and a saddle blanket decorated with a lozenge pattern. The horse's right foreleg is cast separately, entirely in the round. The tail is tied with a ribbon.

The quarry is arranged along the lower right and to the right of the mounted hunter; ibex alternate with gazelle. All four animals are wounded in the shoulder, from which an arrow protrudes. Just off center, at the base of the tondo, is a tripartite stylized mountain, its center gilded; all "mountains" are ornamented with chased stylized foliage.



The closest comparisons for the hunter's headgear among Sasanian coin representations would be the crowns of the Sasanian king Peroz (r. A.D. 457–84) and the crown of his son Kavad I during his second reign (A.D. 499–531).[1] Like the Freer Shapur plate [13], this plate belongs to a group of royal hunting plates decorated with scenes of kings wearing crowns closely resembling those depicted on Sasanian coins and rock reliefs. This plate shares with the group its figural composition and use of the paired-line drapery style. With a mounted hunter charging to the right in pursuit of four quarry, the composition is closest to the Peroz-Kavad I plate in the Metropolitan Museum of Art, New York, and the plate from Ufa, now in the Hermitage Museum, Saint Petersburg.[2] The rendering of the stumbling ram in the bottom right of the Freer plate is very close to that on the Metropolitan Peroz-Kavad I plate. On the Ufa plate, the king employs the Parthian shot; like the scene on the Freer plate, the four quarry consist of two pairs of different species, ibex and gazelle. Details of the horse trappings, however—including the saddle blanket and phalerae—resemble more closely those depicted on the Freer Shapur plate. The royal figure depicted on this plate [14] also holds the bowstring at the top of the chest and below the hair, as does the hunter on the Freer Shapur plate. On the Metropolitan Peroz-Kavad I plate, by contrast, the king holds the bow in front of the mass of hair at the neck. The horse trappings of the Freer plate also resemble those on the plate from Pereshchepina depicting a royal figure hunting rams.[3] The style of the relief and use of gilding, together with the abbreviated mane of the horse, link this plate with the Cleveland Hormizd plate.[4]

The leaf-shaped ends of the ribbons fastening the royal figure's shoes are unusual. Among the silver plates depicting royal hunters, only the Metropolitan Yazdgard plate, with a standing royal figure spearing a stag, shares this feature of royal dress.[5]

The Freer plate also exhibits the changes in the iconography of the Sasanian royal hunting plate that were introduced after Peroz, such as the representation of more than one species of animal among the quarry. This and other developments are found on plates that portray kings who could be one of many but who are all certainly as late as Kavad I.[6] A date after the fourth century and not far removed in time from the Metropolitan Peroz-Kavad I plate would seem likely for the Freer plate. It does not, however, exhibit the same sophisticated artistry of the Freer Shapur plate or the Metropolitan Peroz-Kavad I plate.

Stylized mountains placed at the bottom of the scene also occur on other examples of royal hunting plates and on silver vessels from nonroyal workshops, perhaps beginning as early as the third century.[7]

## Technical Discussion

The plate is a multipart construction, with the body shaped by hammering, probably a combination of raising and sinking. The design on the interior was created by carving, incising, and chasing as well as by adding approximately fifteen separate parts that were set into place by crimping. All separate elements were made by repoussé, except the horse's proper right foreleg, which was cast. Once amalgam gilding was applied, the seams of the added parts became invisible. Additional design elements that stand in relief were carved away from the surrounding background.

A ring foot was soldered to the base of the plate. Textile remains are present on the foot. Microscopic examination of fiber samples suggests that they are bast fibers, possibly hemp. Numerous types of corrosion appear on the plate, including silver chloride, copper chloride, and copper carbonates. The surface is generally pitted and etched. The background surface may have been subsequently cleaned and repolished. Two small losses occur on the proper left side of the plate, and cracks are found in the surrounding metal. The condition of the vessel would not appear possible due to artificial aging and tends to confirm the plate's antiquity. The composition of the foot is unusual in that the zinc content is extremely high.

## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 92.1 | 54.5 |
| Copper | 7.17 | 45.2 |
| Gold | 0.708 | 0.294 |
| | PARTS PER MILLION | |
| Iridium | 0.10 | 0.070 |
| Zinc | 93 | 14000 |
| Tin | <35 | 690 |
| Arsenic | 19 | 2500 |
| Antimony | 4.2 | 300 |
| Selenium | 3.9 | 60 |
| Iron | <8.1 | 430 |
| Cobalt | 0.10 | 51 |
| Mercury | 5.1 | <0.16 |
| Chromium | <0.20 | <1.1 |
| Scandium | <0.0017 | 0.14 |

## Notes

1. Frye 1983, 135, fig. 1.

2. Harper and Meyers 1981, 64–66 (Peroz-Kavad I plate), 66–67 (Ufa plate).

3. Harper and Meyers 1981, 81–82.

4. Harper and Meyers 1981, 60–61.

5. Harper and Meyers 1981, pl. 16; 64 with n. 122, for the obsevation that ribbons with oval ends are shown on the Sasanian relief at Tang-i Qandil and on a painting fragment from Dura-Europus.

6. Harper and Meyers 1981, 72.

7. Harper and Meyers 1981, 52–55, pl. 10 (from Sari in northwestern Iran).

# 15

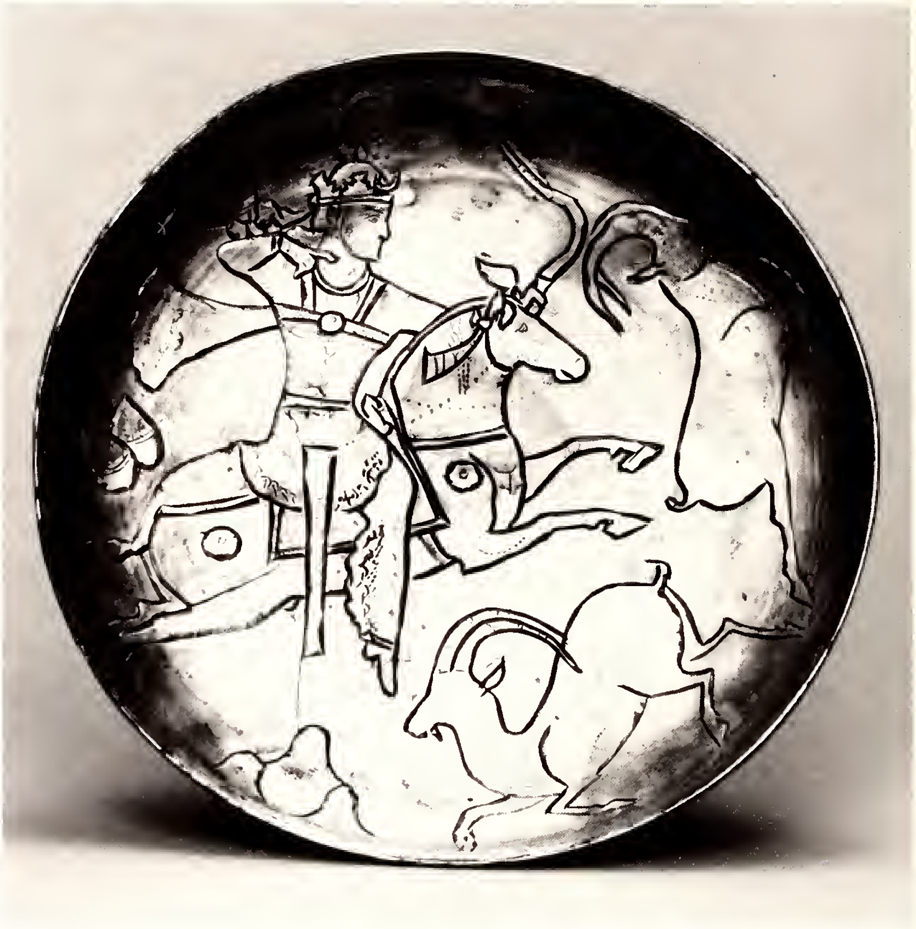
## *Plate*

7th century A.D.
Silver and gilt: hammered, chased, engraved, gilded
Height 4.2 cm
Rim diameter 20.8 cm
Weight 441 g

Arthur M. Sackler Gallery, S1987.109
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1990.

*Unpublished*



THE PLATE RESTS on a low ring foot; its exterior is plain.

On the interior is an engraved and spot-gilded design of a royal figure on horseback, moving to the right, who hunts with bow and arrow two ibex. He wears a tunic, trousers, and halter with central medallion tied in back with long streamers. His headgear consists of a plain band and mural crown with a central crescent, surmounted by a globe. His quiver case is suspended from his belt. One ibex flees to the right; the other, moving in the opposite direction, stumbles below the horse. Beneath the horse is a stylized mountain. A gilded band encircles the inner rim, and spot gilding is found on parts of the royal figure, horse, and animals.

The composition of this plate can be paralleled among a number of royal hunting plates of Sasanian type: a royal figure on horseback, moving to the right, hunts two animals of the same species who are arranged in the field in front of and beneath the horse. This plate differs from most examples, however, in its simple engraved technique of decoration and in certain iconographic details.

The hunter's headdress consists of a mural crown with a front crescent, topped by a globe, an arrangement that does not correspond precisely to any crowns depicted on Sasanian coins. A similar headdress is represented on the coins of several kings who ruled late in the Sasanian period: Peroz (r. A.D. 457–84), Kavad I (r. A.D. 488–531), Khusro I (r. A.D. 531–79), Hormizd IV (r. A.D. 579–90), Bahram VI (r. A.D. 590–91), Khusro II (r. A.D. 591–628), and Kavad II (r. A.D. 628).

Closely related to the Sackler plate in style, composition, and engraved technique is a silver plate found at Nizhne Shakharovka, near Perm, Russia, depicting a royal figure hunting boars; the vessel is now in the Hermitage Museum, Saint Petersburg.[1] The deeply engraved surface and use of spot gilding on these plates contrast with the characteristic technique of Sasanian royal hunting plates, in which separately made pieces are added in relief to the surface, with extensive gilding on the decoration. The simplicity of the style and technique of decoration of these two plates suggest that they are products of a provincial workshop, perhaps made at the end of the Sasanian era or in the early Islamic period, when local workshops imitated Sasanian court silver. The silver composition of the Nizhne Shakharovka plate is characteristic of the central Sasanian group of royal hunting plates produced under direct imperial control. Pieter Meyers has suggested that the use of this silver source may reflect different conditions governing control of the metal at the end of the Sasanian period or shortly thereafter, in which sources of silver previously monopolized by the court may have become newly available to nonroyal workshops.[2]

Both stylistic and technical features suggest a date for the Sackler Gallery vessel late in the Sasanian period or shortly afterward. Spot gilding occurs on Sasanian silver vessels early in the period [see 38] but does not seem to be employed again until late in the Sasanian period.[3] The simple engraved style of the decoration and the adaptation of the royal crown and hunting theme also suggest a date late in the Sasanian era, when local or provincial workshops produced vessels imitating earlier court silver.

## Technical Discussion

The plate is made of two parts: the body and the foot. While the body was mainly shaped by hammering, slight annular ridges appear on the inner and

outer surfaces. These toolmarks suggest the use of a lathe or some device to rotate the plate during a process by which the metal was cut away or finished. A centering mark is present on the outer surface, but none is found on the inner surface. The foot was formed from a strip of metal; a scarf joint was used to join the ends of the strip and form a ring. The joint was soldered closed and the foot was soldered to the plate.

The design was executed by chasing, engraving, and spot-amalgam gilding. Engraved lines with beveled edges define the linear details. Various punches, primarily a dot and ring punch, were used for further details.

The wear and corrosion on the plate indicate its antiquity. Malachite (copper carbonate corrosion) is present in many deep recesses of the engraving. Two breaks occurred in the metal in the lower, proper right side of the plate; these breaks follow lines of engraving and thus suggest that the engraving was cut so deeply that it weakened the metal.

## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 91.3 | 92.4 |
| Copper | 7.96 | 6.75 |
| Gold | 0.784 | 0.835 |
| | PARTS PER MILLION | |
| Iridium | 0.060 | 0.021 |
| Zinc | 200 | 75 |
| Tin | 620 | 590 |
| Arsenic | 59 | 39 |
| Antimony | 7.1 | 6.5 |
| Selenium | 3.7 | 2.5 |
| Iron | 160 | 43 |
| Cobalt | 3.2 | 0.75 |
| Mercury | 0.14 | 0.17 |
| Chromium | 0.79 | 0.23 |
| Scandium | 0.082 | 0.0034 |

## Notes

1. Harper and Meyers 1981, 86, pl. 32.

2. Harper and Meyers 1981, 158.

3. Harper and Meyers 1981, 157, 190.

# 16

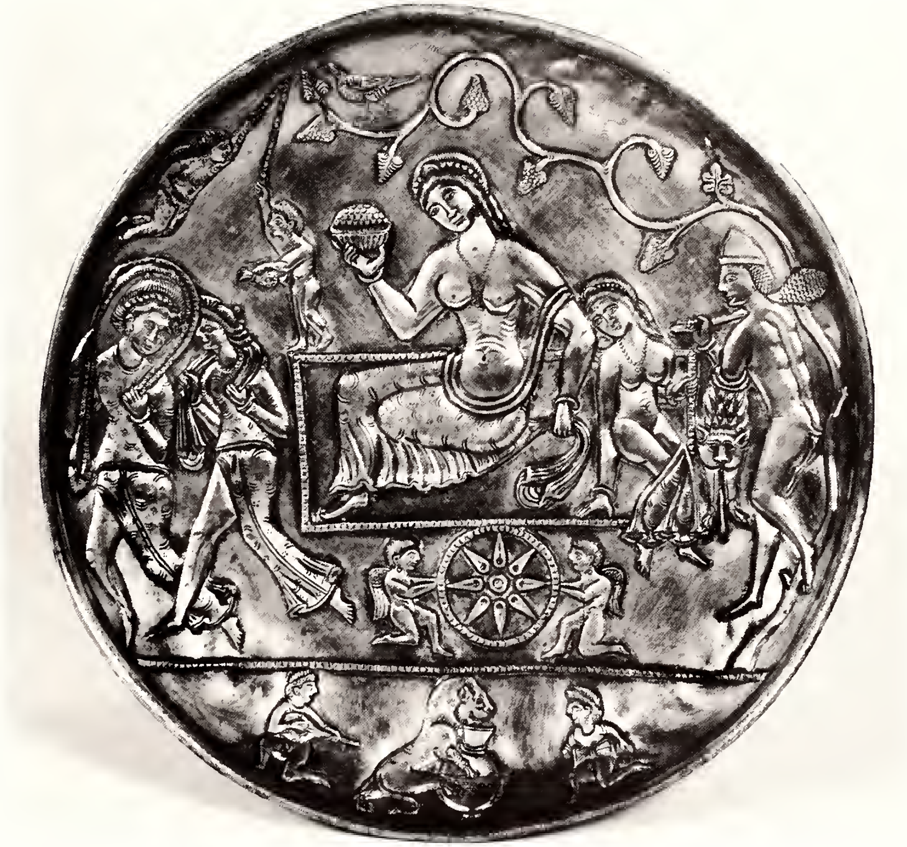
## Plate

5th–7th century A.D.
Silver and gilt: hammered, carved, chased, engraved, gilded
Inscribed within ring foot (traces only)
Height 4.1 cm
Rim diameter 21.9 cm
Weight 841 g

Freer Gallery of Art, 64.10
Purchased from M. Mahboubian, 1964

*Exhibited:* Freer Gallery of Art, from 1965.

*Published:* Ettinghausen 1967–68, 39, fig. 17; Chase 1968, 85–93; Atıl 1971, no. 48; Ettinghausen 1972, 4–5; Harper 1982, 182–83; Augé and Linant de Bellefonds 1986, 526–27, no. 128.



AROUND THE EXTERIOR of this plate, just below the rim, is an engraved line. On the bottom, traces of a dotted inscription are visible within the ring foot.

The interior is decorated with figures in low relief and the background is entirely gilded. A seated Dionysus appears in the center in a slightly awkward frontal rendering; he holds a fluted bowl in his right hand and a drapery edge in his left hand. His upper body is nude, drapery covers his legs; he wears a diadem, earrings, bracelets, and a necklace with pendant. Ariadne, nude except for drapery across her lower legs, sits to the right. She too wears a diadem, bracelets, and necklace with pendant. Both figures sit within a rectangular frame enclosed by beaded molding, representing the chariot of Dionysus. A standing Heracles, in profile and three-quarter view, frames the scene on the right; he holds a club and lion skin. Behind Heracles, growing from the ground line of the exergue up and over the figure of Dionysus, is a grapevine with a bird near the end of the branch. Below the rectangular frame, two small winged figures flank an eight-spoked wheel on which the chariot rests.

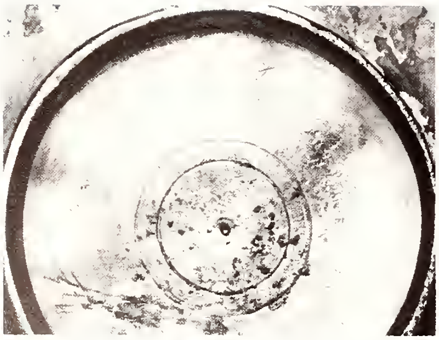
In the upper left a small naked figure holds a decorated ewer and a whip; the other end of the whip is held by a flying winged figure above left. To the left of the chariot two female figures move to the left; they wear long-sleeved garments and a form of loose trousers and hold scarves over their head or shoulders.

In the exergue a panther drinks from a vase. A musician on the left plays a lutelike instrument; the figure on the right plays drums.

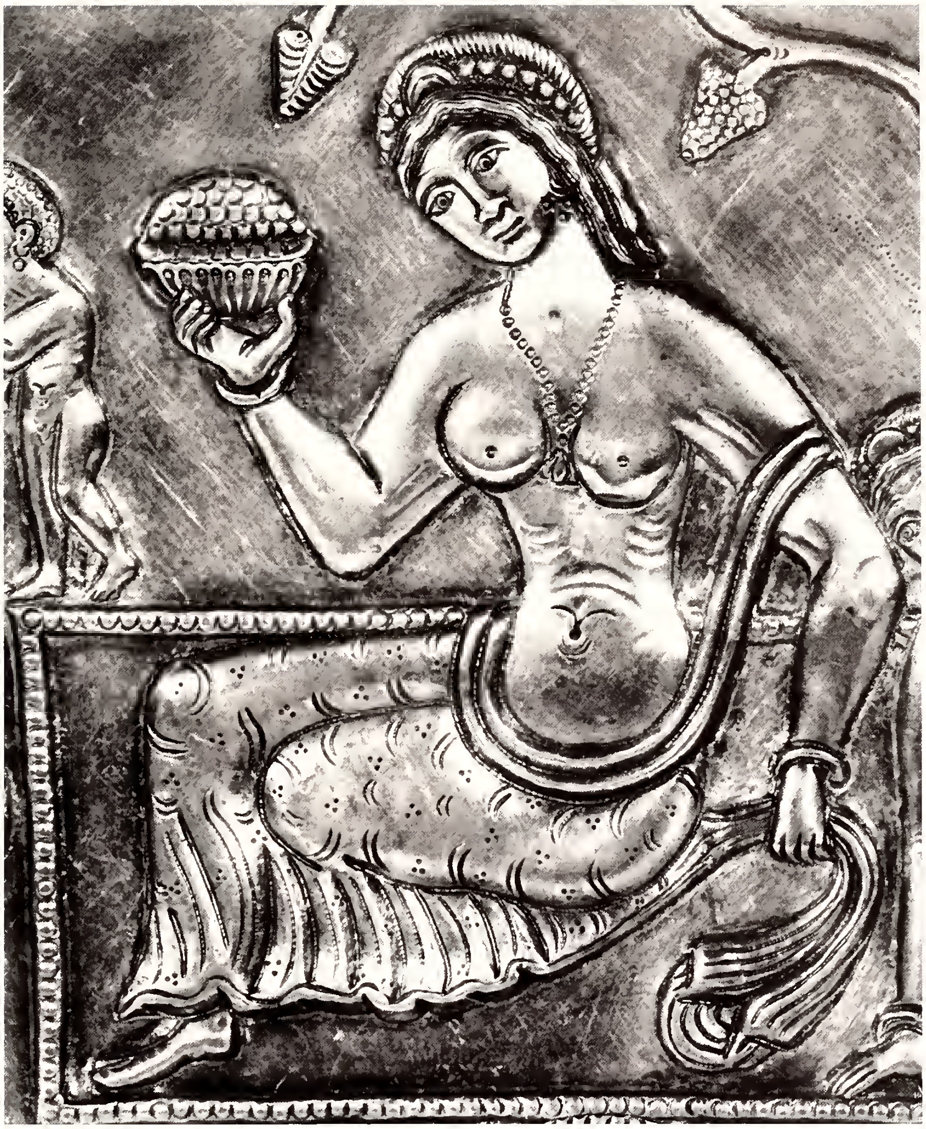
This plate was one of the first silver vessels of Sasanian date to be studied in detail from a technical point of view, in a pioneering study published in 1968.[1] It remains an important example because of its high quality and the unusual subject of its interior decoration, which can be closely linked to a few other extant works.

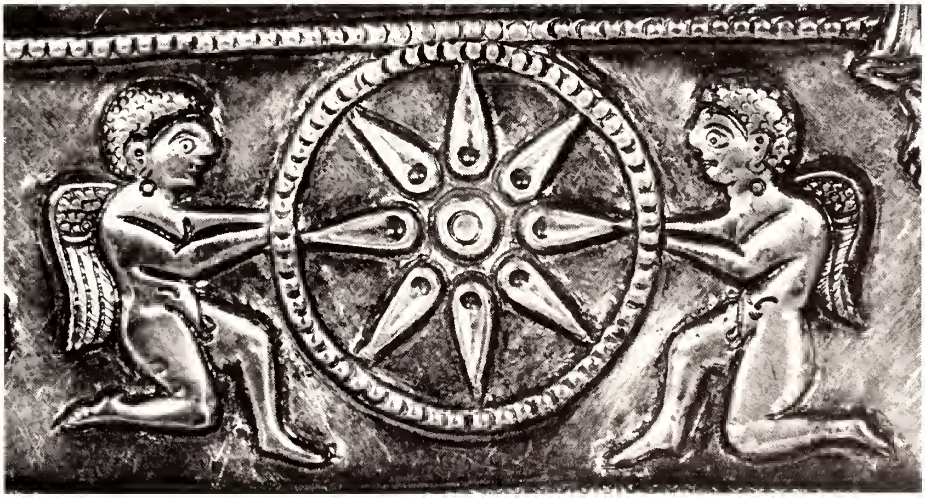
The subject depicted is the triumph of Dionysus, the specific iconography of which can be traced in gemstones and other minor arts of the Roman imperial period. The subject was illustrated on mosaics and textiles in Syria, Cyprus, and Egypt.[2] Its transfer to Sasanian silver vessels can be seen in three surviving plates, of which the Freer example is perhaps the latest.

The earliest of the group was also the first to become known to modern scholars. A silver plate in the British Museum, London, whose recent history was traced to northern India, was published by O. M. Dalton, together with a discussion of the theme and its Roman prototypes.[3] In 1953 another silver plate depicting the subject came to light near Alkino Ufim in the Ural Mountains region of northern Russia; it is now in the Historical Museum, Moscow.[4] The third plate was acquired by the Freer Gallery in 1964 without information on its recent past.



The iconography of the three Sasanian plates draws on Roman and Byzantine prototypes depicting the triumph of the god.[5] The British Museum plate, which probably dates to the third century, is closest in style and composition to Roman representations. To the traditional representation of Dionysus and Ariadne in a chariot drawn by winged figures are added new elements, including the figure of Heracles and a panther drinking from a vase. The Moscow and Freer plates, which are almost identical in figural composition, draw closely on the design employed for the British Museum plate. Differences introduced in the two later plates are the two maenads who serve in place of winged figures pulling the chariot of the god, the larger scale of the figure of Ariadne, a second

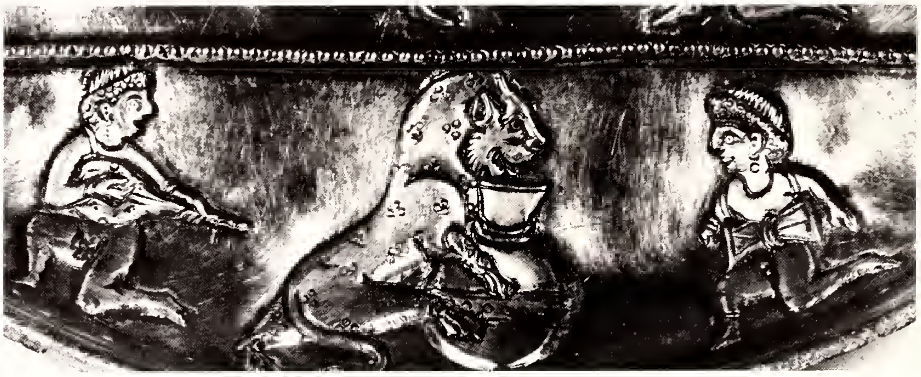




winged figure near the wheel, and two musicians who flank the panther in the exergue. On the Freer and Moscow plates the small figure in the upper left who holds a ewer lacks wings. In both examples Dionysus is seated, not reclining, and he is shown in a markedly feminized form. Indeed, Dionysus and Ariadne are similarly coiffed and bejeweled.[6] The Moscow and Freer plates are almost identical in composition and are also close—but not identical—in style. On the Moscow plate, plant forms flank the two musicians in the exergue, a feature lacking on the Freer plate. The rendering of the hairstyle differs, and the faces of Dionysus and Ariadne are more elongated and stylized on the Moscow plate. Finally, on the Moscow plate the drapery of Dionysus is decorated with a pattern of a cross enclosed in a rope medallion.

The Freer plate shares several features with the central Sasanian group of royal hunting plates. The exterior is plain, with a chased line around the circumference just below the rim. The decoration on the interior is achieved with the use of hammering and carving, with chased details, on a gilded background surface. The maenads on the Freer plate wear costumes whose drapery ornament, with ring-matted and paired-line patterns, is typical of female costume on Sasanian silver. The maenads hold scarves over their heads, a gesture seen also among the dancing female figures on Sasanian silver vessels.[7] The motif of the panther drinking from a vase is also paralleled on vases of the Sasanian period (see, for example, the silver-gilt vase [33]). Yet key stylistic features of the rendering of Dionysus and Ariadne—such as the bend of the heads, sloping shoulders, ample bosom with globular breasts, narrow waists, and full hips—suggest South Asian influence. Comparisons with the Begram ivories, for example, illustrate those similarities.[8] Female dancers with related forms, although more clearly linked to Indian styles of representation, are depicted on a Sasanian silver lobed elliptical bowl found in Perm and now in the Hermitage Museum, Saint Petersburg.[9]

Since the Freer plate is decorated with such an unusual subject and since it is uncommonly indebted to both western and eastern elements of iconography and style, it is difficult to date. The gilded background surface, drapery style, and influence of Central or South Asian artistic traditions, all point to the later



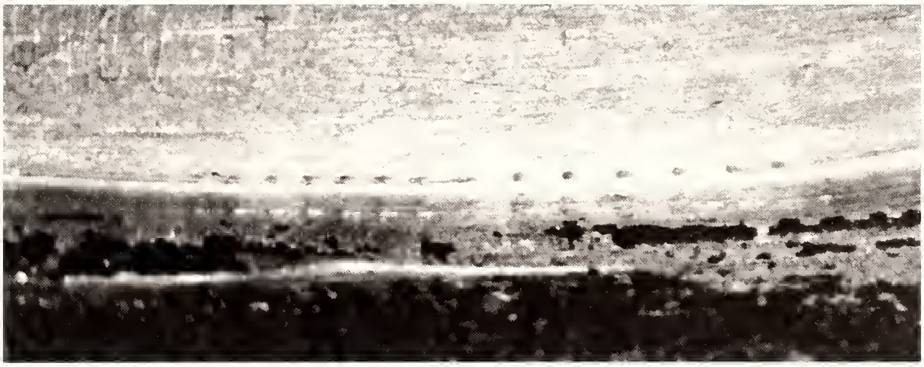


Fig. 1. Photomicrograph of a row of chased dots at the juncture of the foot and body.

part of the Sasanian period, in the fifth to seventh centuries. The Freer plate may be approximately contemporary with an early Byzantine silver bowl depicting the same subject, perhaps made in Constantinople, in the Dumbarton Oaks Collection, Washington, D.C.[10]

The close dependence of the Moscow and Freer plates on the design of the British Museum plate, which dates to a much earlier period, raises interesting questions about the mechanics of production, including the transmission of designs.

## Technical Discussion

A detailed technical description of the plate has been previously published.[11] Metallographic and radiographic studies demonstrate that the body of the vessel was hammered. The body is thicker toward the center and becomes progressively thinner until it reaches the rim where it becomes thick again. The inside surface of the rim is rounded and measures little more than 3 millimeters at its widest point. The background areas vary in thickness but measure as little as 0.6 millimeters in some places near the rim, while adjacent areas of raised design are twice as thick.

The nature of the foot and its manufacture are not clear. No solder can be seen at the juncture of the foot and the body in the radiographs or by visual inspection. One theory is that the body and foot are one piece, which was either roughly cast and then heavily worked by hammering to shape the body and foot.[12] An alternative suggestion is that the ring foot may be a separate piece fitted into an annular channel cut in the bottom of the plate and then secured by hammering the metal of the body into the metal of the ring foot along their juncture.[13] Radiographic examination does not reveal clear evidence in support of either of these possibilities, but some microscopic features seem to relate to the forming of the foot. Small gaps are present along the edge where the body and the foot meet. These gaps may be simply deep scratches but appear to be a juncture. Of more interest is a line of evenly spaced punch marks found along the bottom of the body and near the side of the foot (fig. 1).

This feature has also been found on another silver dish [5]. The line presumably delineates the juncture of the ring foot and body. What appear to be finishing scratches also follow this juncture. The heavily worked structure of the metal, apparent in the metallographic section, argues against the idea that the vessel was cast into shape and then finished by tooling. And while the composition of the foot and body is virtually identical, this is not proof that they are one piece of metal. The Freer Shapur plate [13] also displays a great similarity in composition between the foot and the body, but the two parts are clearly soldered together. The evidence is not conclusive but suggests that the foot and body on this plate [16] are separate pieces joined without the use of solder.

Within the ring foot, on the bottom surface of the plate, is a centering mark and two annular lines. The lines appear to have been formed by cutting or engraving. Also inside the ring foot are faint punch marks that make up part of an inscription.

Areas of relief were created by carving. Evidence for this technique is found along the edges of the raised areas where linear ridges are present, which were apparently left by gouging out the surrounding metal.

Design details are chased. Where different toolmarks overlap, the sequence of tooling can be determined. Most frequently the linear chasing appears to have been applied first, particularly along the outlines of the raised areas. In some cases, however, where ring matting has been applied, the tooling of the outlines overlaps the edges of the ring matting and may have been added later to strengthen the outline. The chased details made last appear to have been the groups of circular punch marks applied to the garments of the figures.

No analysis was performed of the gilding, but it has all the visual features of amalgam gilding, such as a granular, pasty structure in the recesses of the toolmarks and areas of spillover onto the raised relief where the liquid gilding mixture ran during the process of heating to remove the mercury.

Traces of copper corrosion and areas of tarnish are present on the surface. About half of the back surface bears an encrustation layer. Faint traces of a textile pattern are found there in the corrosion and encrustation.

## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 94.2 | 94.1 |
| Copper | 5.16 | 5.23 |
| Gold | 0.668 | 0.668 |
| | PARTS PER MILLION | |
| Iridium | 0.11 | 0.10 |
| Zinc | 210 | 210 |
| Tin | 330 | 330 |
| Arsenic | 16 | 16 |
| Antimony | 2.1 | 2.3 |
| Selenium | 1.3 | 1.5 |
| Iron | <6.4 | <9.7 |
| Cobalt | 0.53 | 0.15 |
| Mercury | 0.12 | 0.22 |
| Chromium | <0.28 | <0.38 |
| Scandium | <0.00018 | <0.0026 |

## Notes

1. Chase 1968, 85–90.

2. Augé and Linant de Bellefonds 1986, 526–27; also Lenzen 1960, 1–38. Dionysiac imagery in Gandharan and Kushan art is treated by Francfort 1979, 19–22, 31; and Carter 1968.

3. Dalton 1964, 49–51, no. 196, pl. XXVII. The plate was in Badakhshan in northeastern Afghanistan until 1829; it was transferred to the British Museum from the India Office in 1900.

4. Smirnov 1957; also Marshak 1986, 254, figs. 174–76.

5. Ettinghausen 1972, 4–5, figs. 11, 12.

6. Lenzen 1960, 2–4, observes that many representations of the god in Roman and Coptic art present him in a feminized form.

7. For example, a boat-shaped bowl also depicting an enthronement scene, in the Walters Art Gallery, Baltimore: Harper and Meyers 1981, 119, pl. 36.

8. Rosen 1974–75, 39–48, summarizes problems of dating and interpretation and includes an extensive bibliography.

9. Orbeli and Trever 1935, pl. 58.

10. Ross 1962, 5–7, no. 6, pls. VI, VII. Ettinghausen 1972, 4, fig. 11, also cited the Dumbarton Oaks bowl in connection with the Freer plate. The bowl has been dated to the fifth or early sixth century.

11. Chase 1968.

12. Chase 1968.

13. Pieter Meyers, private communication.

# 17

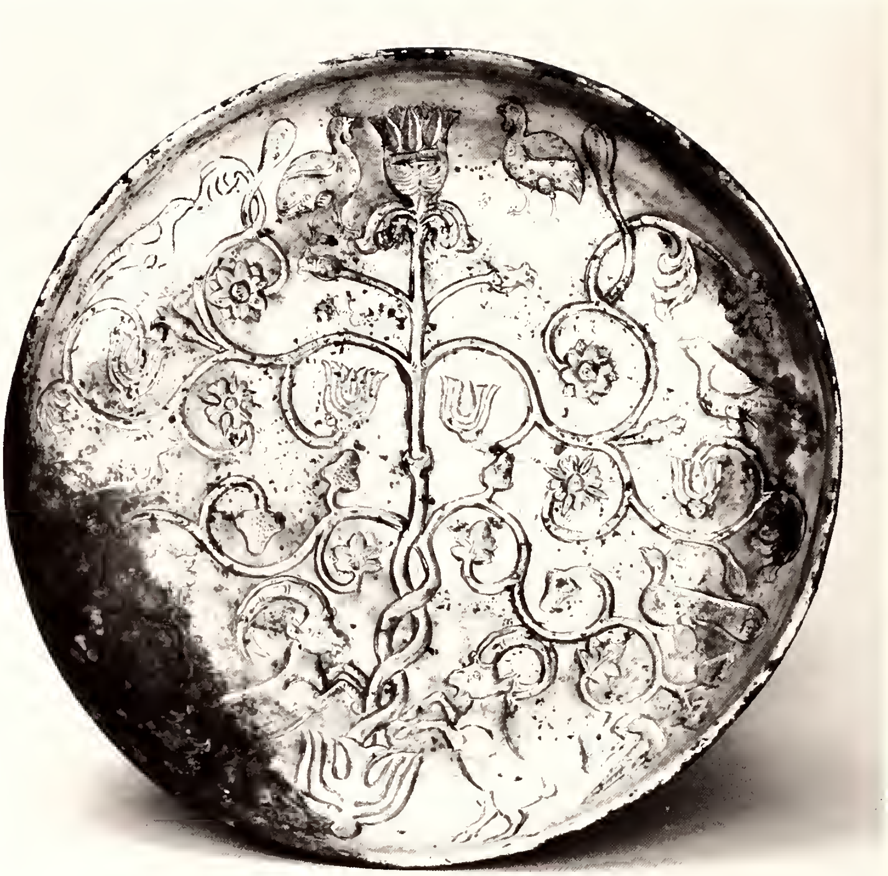
## *Plate*

6th–7th century A.D.
Silver and gilt: hammered, chased, gilded
Height 4.7 cm
Rim diameter 21.2 cm
Weight 567 g

Arthur M. Sackler Gallery, S1987.124
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



A NARROW GILDED BAND encircles the inner rim, and details of the interior decoration are gilded. The exterior is plain.

In the interior, two rampant ibex flank a tree formed by grapevines. Vines extending to the right and left of the main trunk grow from a large calyxlike container or base. The vines cross at the base to form a guilloche pattern. Terminating in grape, leaf, rosette, star, and calyx patterns, the vines are inhabited by peacocks, birds with long tail feathers, and a pair of peahens flanking the upper calyx. A punched branch pattern near the upper part of the main vine seems to be a guideline indicating the design of the relief.

The pair of rampant ibex flanking a tree or vine that decorates this plate interior occurs on Sasanian stucco patterns of the sixth to eighth centuries.[1] No exact parallels among silver vessels are known to me, but a similar design with flanking mouflon appears on a plate with a gilded background surface.[2] A related example, showing ibex flanking a tree, is in the Hermitage Museum, Saint Petersburg.[3]

The birds that inhabit the vines on the Sackler plate belong to species encountered often in Sasanian decorative arts. Peahens appear on other ex-

amples of Sasanian silver vessels, including the interior of a bowl in the Sackler Gallery [26], and on other categories of Sasanian art, including stucco and seals.[4]

Spot gilding of the decoration is found on other silver vessels of late Sasanian date, including two other plates in the Sackler Gallery [15, 18].

## Technical Discussion

This plate exhibits a typical hammered form. The rim measures from 2.5 to 3.0 millimeters thick, while the background areas are as little as 1.0 millimeters thick. The separately formed ring foot was attached by soldering.

The decoration of the plate was carved and chased, with the areas of high relief standing only 0.25 to 0.5 millimeters above the background. Amalgam gilding was employed, but only traces remain. Two engraved lines on the inside surface, close together, set off the thickened rim. The outer surface of the vessel is plain except for a slight centering mark.

Malachite (copper carbonate) and cuprite (copper oxide) corrosion products are present on the inner surface and completely cover the outer surface. Botryoidal malachite is also present. The extensive copper corrosion is no doubt due to the high percentage of copper in the plate. The front surface of the plate was cleaned after its acquisition by the gallery.

Textile pseudomorphs are present on both surfaces and some very deteriorated textile remains are affixed to the outer surface. The textile has a plain weave and the threads have a Z twist. The fibers appear to be bast fibers.

## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 68.9 | 93.8 |
| Copper | 30.9 | 5.66 |
| Gold | 0.245 | 0.538 |
| | PARTS PER MILLION | |
| Iridium | 0.18 | 0.095 |
| Zinc | 61 | 150 |
| Tin | <26 | 8000 |
| Arsenic | 170 | 300 |
| Antimony | 39 | 46 |
| Selenium | 34 | 10 |
| Iron | 3.5 | 100 |
| Cobalt | 4.7 | 12 |
| Mercury | 0.51 | 0.081 |
| Chromium | 0.31 | 0.13 |
| Scandium | <0.0018 | <0.0027 |

## Notes

1. Kröger 1982, pl. 99, fig. 4.

2. Sotheby's 1985, no. 161. My thanks to Prudence Harper for bringing this vessel to my attention.

3. Orbeli and Trever 1935, pl. 32. Flanking goats atop stylized mountains appear on the exterior end of a lobed bowl also in the Hermitage: Orbeli and Trever 1935, pl. 38.

4. For additional references on the peahen in Sasanian art, see [26].

# 18

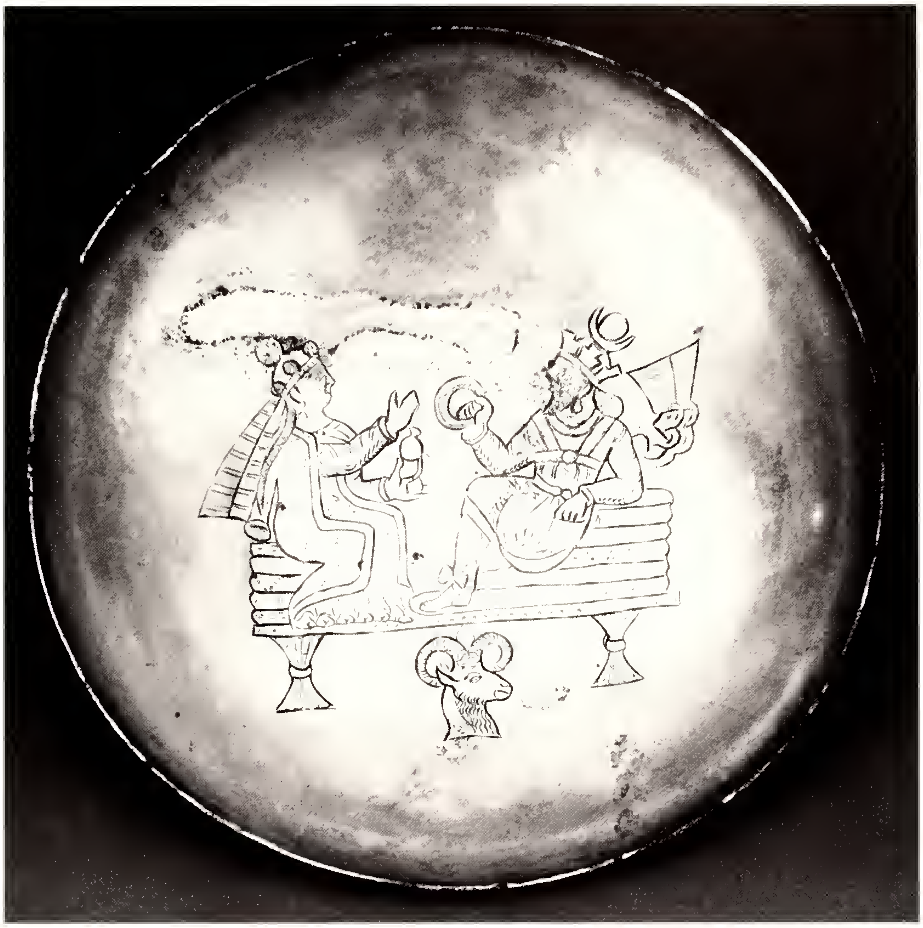
## *Plate*

7th century A.D.
Silver and gilt: hammered, chased, gilded
Height 4.8 cm
Rim diameter 19.0 cm
Weight 236 g

Arthur M. Sackler Gallery, S1987.113
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

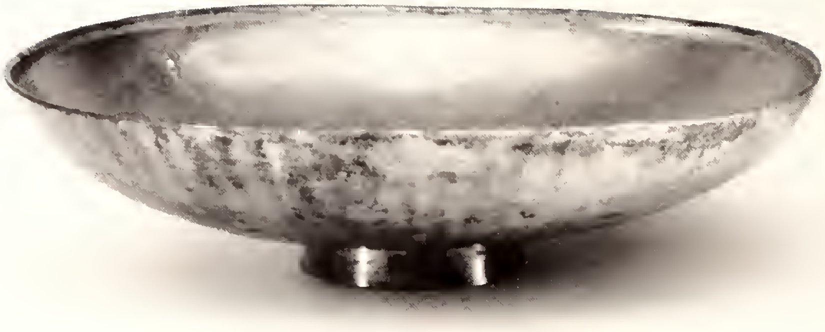
*Published:* Gunter 1988, 43, fig. 26.



SHALLOW VERTICAL FLUTES ornament the exterior of this small plate with a low ring foot. Within the ring are a centering mark and a concentric circle approximately two centimeters in diameter. A chased line from the centering mark, about one centimeter above the foot, marks the lower edge of the fluted zone. The rim is slightly thickened, and a narrow gilded band encircles the inner rim.

The interior center is chased or engraved with a scene of a couple seated on a couch. On the left sits a female figure whose hair is arranged in a long pigtail and topknot, adorned with a diadem and long streamers. Over her long-sleeved dress she wears a robe, revealing an empty sleeve; on the drapery are ring-matted and paired-line patterns. Her right hand is extended toward the male figure; in her left hand she holds a small vessel or flower between her thumb and forefinger.

On the right a male figure wearing a mural crown with crescent and globe reclines on the couch, one leg tucked beneath him. He is dressed in tunic and trousers rendered in paired-line drapery style; apron; beaded halter with central medallion tied in back, with ribbons floating to the right; and greaves with a scalloped edge. He holds a wreath in his right hand and leans on his left elbow. Below the couch is the head of a ram, in profile facing right.



Gilded details are headgear, borders of robes, halter, belt, and shoelaces, vessel, wreath, alternating pillows on couch, bands around couch legs, and ram's horns.

The subject of the decoration, a couple seated on a couch and grasping a wreath or diadem, is a theme found on Sasanian gemstones and on a small silver-gilt bowl in the Sackler Gallery collection [25].[1] Among silver plates with a ring foot, the only close parallel is in the Walters Art Gallery, Baltimore. The interior of the Walters plate is decorated in very low relief with a scene of a banqueting couple; a male figure wearing a crown holds a diadem. In the form of the vessel as well as in the style and technique of the decoration, the Walters plate departs from Sasanian traditions. Some scholars have suggested a Central Asian origin to account for these features as well as for the crown types worn by the banqueting couple. A banqueting scene very similar to that on the Walters plate, including the group of wreaths placed below the couch, appears on a painted ceramic amphora excavated from the site of Merv in Turkmenistan.[2]

On the Sackler Gallery silver plate the male figure wears a mural crown with a beaded diadem and a globe rising above a central crescent. While these elements are found on the crowns depicted on the coins of a number of Sasanian kings, no exact parallel is known. The hairstyle and costume of the woman on the plate resemble those of a figure on a Sasanian hunting plate in the Guennol collection, perhaps dating to the fifth or early sixth century.[3] A similar hairstyle is depicted on a silver plate from northern India, now in the British Museum, London.[4]

Although the theme of the royal banquet had a long and important history in the ancient Near East, it was unusual in Sasanian art. References to the significance of the banquet in courtly society are found in Middle Persian literature and preserved in Firdausi's epic *Shahnama*.[5] Most representations, however, are found on silver vessels of Sasanian type, but which differ in form or style from central Sasanian royal silver plate and which were almost certainly made after the fall of the empire or beyond its frontiers. Two are silver-gilt plates, now in the Hermitage Museum, Saint Petersburg, which depict a male banqueter seated in the center, accompanied by servants and musicians or other entertainers.[6] Only two other silver plates have as their sole subject of decoration a banqueting royal couple. One is in the Walters Art Gallery, mentioned above; the second is a silver-gilt plate in the British Museum.[7] All four plates are distinguished typologically, technically, or stylistically from Sasanian silver vessels and must be considered products of eastern or of post-Sasanian workshops.

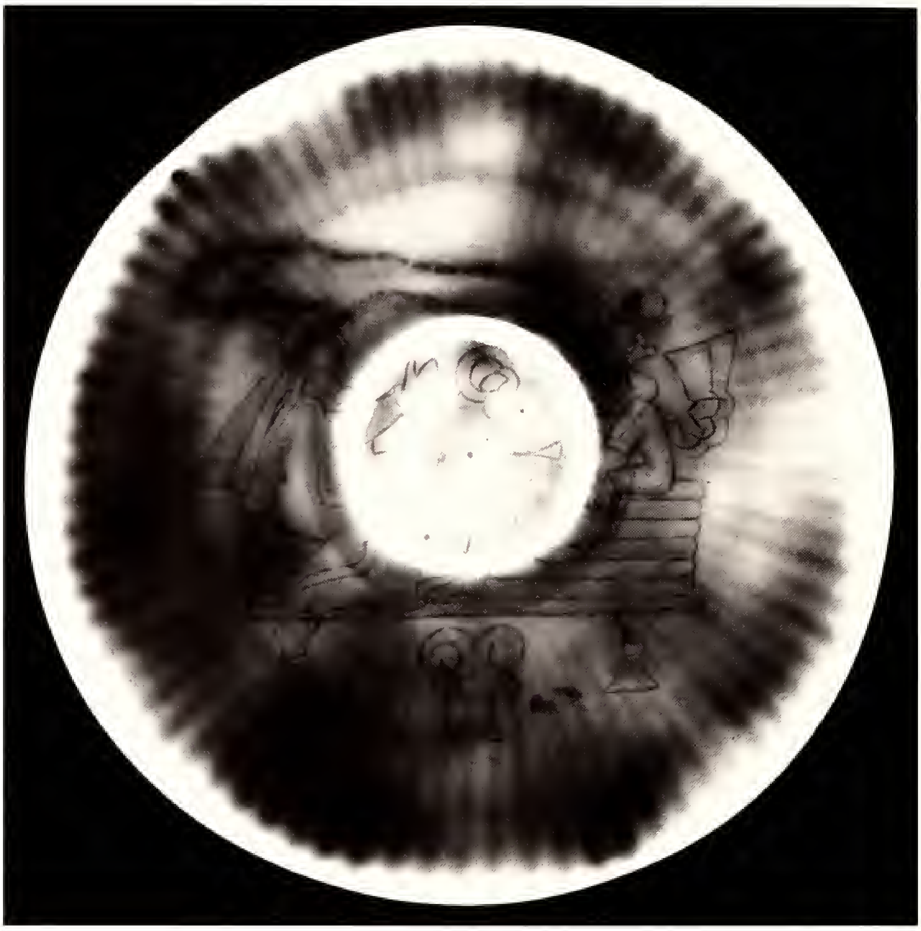
Both Martha Carter and Nina Garsoïan have drawn attention to the heroic aspects of the royal banquet in Sasanian tradition, an interpretation that could help explain the presence of several features of the Sackler plate. The head of a ram shown below the couch has parallels on other examples of Sasanian and Central Asian silver. On the plate in the Walters Art Gallery a row of boars' heads appears below the couch. The heads have sometimes been thought to suggest the theme of the royal hunt. Another interpretation emphasizes instead the religious dimension of the animals, symbols of the god Verethragna and thus also of valor.[8] The ram's head on the Sackler Gallery plate would symbolize royal glory and thus a heroic aspect of the royal banquet.

A number of features suggest that the Sackler plate was made late in the Sasanian period. The fluted exterior is a feature found on a late group of plates with interior ornament [see 19–21]. The scene on the interior is confined to the center, an approach to decoration characteristic of Sogdian silver vessels of the eighth and ninth centuries.[9] Another late feature is the spot-gilded decoration, which also occurs on vessels made toward the end of the Sasanian period or shortly after [15, 17]. The crown worn by the male figure does not correspond exactly to that of any one Sasanian ruler, suggesting that the plate was made late in the period, when local or provincial workshops produced silver vessels imitating earlier court silver. The style of drapery and rendering of the figures also resemble those on Sasanian silver vessels of the sixth and seventh centuries.

## Technical Discussion

The radiographic density of the plate indicates that the plate was formed by hammering (fig. 1). Carving was used to create the radial flutes on the outer surface, which are quite shallow with no sharp edges between the raised and recessed areas. The foot, most probably formed by bending a strip of silver into a circle, was soldered to the body. Both the body and foot are extremely thin and light. The wall of the plate is about one millimeter thick, while the rim is twice as thick. A centering mark is present on the outer surface. Two recessed annular lines, apparently incised, surround the foot.

Fig. 1. Radiograph showing changes in metal density due to forming by hammering.



The design on the inner surface of the plate was formed by chasing, although the long, slightly curving recessed lines may have been engraved. The thickness between the decorated and nondecorated areas of the plate does not differ. A raised surface corresponding to the toolmarks of the design can be seen in some areas on the outer surface, indicating that the chasing of the design occurred after the radial fluting had been shaped. Amalgam gilding was applied selectively to the design and to the inside edge of the rim. Gilded details include headgear, borders of robes, halter and shoelaces, vessel, wreath, alternating pillows on the couch, bands around couch legs, and ram's horns.

The plate has suffered over time. A small hole and a few small cracks are present in the body. The surface condition of the plate suggests that it was once heavily corroded and subsequently cleaned. Minute amounts of silver and copper corrosion are found in many areas on the surface. The curious oval cloud over the head of the female figure is apparently caused by corrosion and later attempts to remove it. Abrasive toolmarks and cavities containing what appear to be corrosion define the oval shape. X-ray fluorescence surface analysis does not indicate any difference in composition between the metal within the oval and other areas on the body nor is there any change in radiographic density.

A small textile fragment is present on the inside of the foot. The textile has a plain weave with the threads having a Z twist; the type of fiber could not be determined.

## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 79.1 | 80.5 |
| Copper | 20.8 | 19.4 |
| Gold | 0.169 | 0.0935 |
| | PARTS PER MILLION | |
| Iridium | 0.0030 | 0.0016 |
| Zinc | 65 | 60 |
| Tin | <86 | 110 |
| Arsenic | 130 | 120 |
| Antimony | 13 | 15 |
| Selenium | 38 | 9.8 |
| Iron | <16 | <16 |
| Cobalt | 1.6 | 12 |
| Mercury | 0.62 | 0.16 |
| Chromium | <0.52 | <0.29 |
| Scandium | <0.0049 | <0.0073 |

## Notes

1. Bivar 1969, 66, pl. 8, CF 2/120200.

2. The plate in the Walters Art Gallery is illustrated in Grabar 1967, 100–101, no. 13, with bibliography (to which add Ackerman 1940, 324). Carter 1974 provides an important discussion. The amphora from Merv is illustrated in Carter 1974, pl. XI, fig. 10.

3. Harper and Meyers 1981, 198–99, pl. 38 ("Bahram Gur" hunting).

4. Dalton 1964, 58–59, no. 204, pl. XXXIII.

5. Garsoïan 1985a, 27–33.

6. Orbeli and Trever 1935, pls. 16, 18.

7. Ghirshman 1953, 59–71. A banqueting royal couple is also depicted on a Kushano-Sasanian plate in the British Museum: Harper and Meyers 1981, 109, fig. 35. Further discussion of this theme is found in Carter 1974, 179–202.

8. Ghirshman 1953, 65; Garsoïan 1985b, 57–59.

9. For example, Marshak 1986, pls. 23–26.

# 19

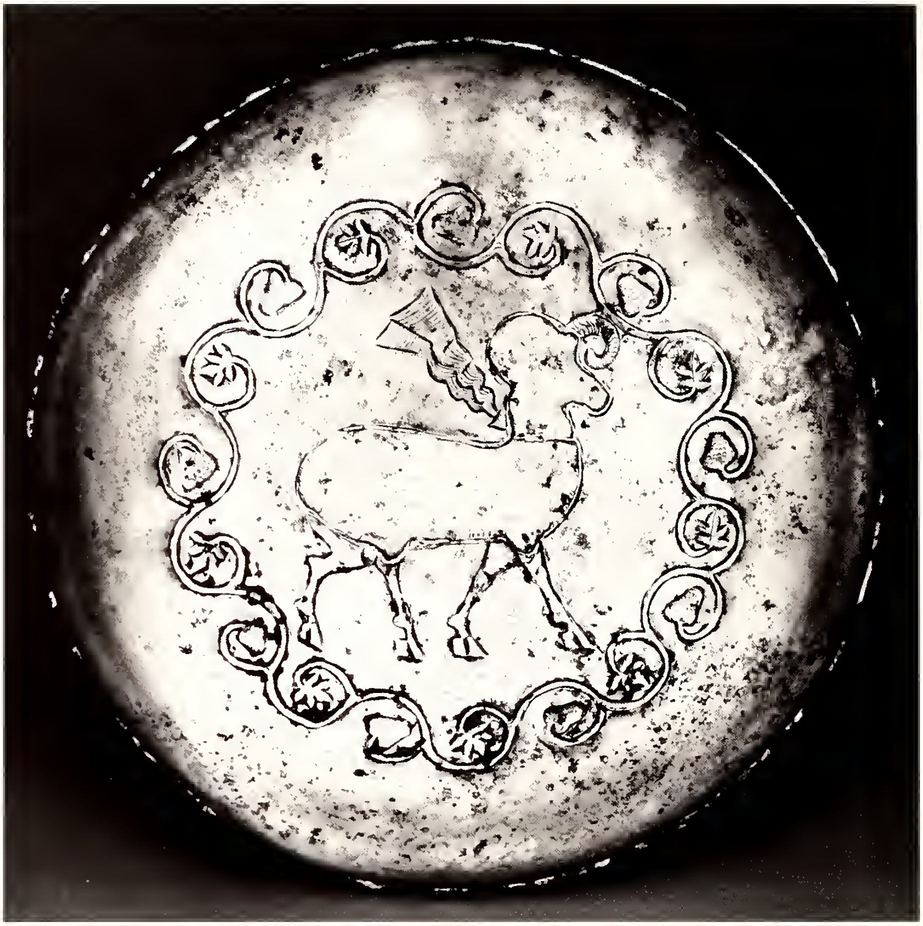
## *Plate*

7th century A.D.
Silver: hammered and chased
Height 5.2 cm
Rim diameter 21.7 cm
Weight 443 g

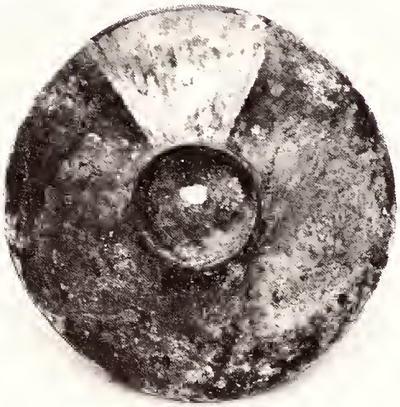
Arthur M. Sackler Gallery, S1987.115
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



SHALLOW FLUTES EMBELLISH the exterior of this plate with a low ring foot; the rim is plain. On the interior, originally added in relief, is a striding mouflon or ram in profile facing right, encircled by a vine scroll. The head and body of the animal, made of separately cast or hammered pieces, are now missing. A long fillet tied around the ram's neck ends in fluttering streamers.



Plates decorated on the interior with a striding ram in a landscape or vine setting are preserved in the collections of the Museum of Fine Arts, Boston, and Abegg-Stiftung, Bern.[1] Neither vessel, however, has a fluted exterior. The latter feature seems to have been introduced late in the Sasanian period, in the sixth or seventh century. Another feature suggesting a late date for the Sackler plate is the restriction of the decoration to the central part of the interior, in contrast to the usual Sasanian practice [see 13–17]. This decorative approach is characteristic of Sogdian silver vessels of the eighth and ninth centuries.[2]

A deep plate with a fluted exterior was found by chance at Lenkoran, Azerbaijan. The Lenkoran plate, also decorated with a striding ram with a fillet, has a deep bowllike form and lacks a ring foot. It is dated on stylistic grounds to the seventh century.[3]

The ram or mouflon is associated in Zoroastrian writings with the warrior-god Verethragna and with royal glory or fortune *(xvarnah)*.[4] It appeared frequently in Sasanian art, on silver vessels [see 21], as a stucco pattern, on textiles, and also on sealstones belonging to individuals of various social ranks.[5]

## Technical Discussion

The basic shape of the plate was formed by hammering. A ring foot, relatively tall and thin-walled (approximately 1.5 mm), was attached using solder. Besides the two parts that comprise the body and foot, two additional pieces of metal were used for the form of the ram, one for the head and another for the body. The outline of the head and body has a distinct, undercut lip. The metal surface was chiseled to create a beveled edge inside the outline; this feature is also seen clearly on the Freer Shapur plate [13], where an inset piece has been lost, and it is a typical feature found on Sasanian plates bearing added elements affixed by crimping. An undercut line where the neck meets the body indicates the juncture between the two inset pieces. Carved features, such as the vine motif or the legs, horn, and scarf, were also made to appear in even greater relief by beveling the outline where they meet the background. These features have the same thickness as the undecorated body of the plate adjacent to them, approximately one millimeter. It would seem that the radial flutes on the outer surface were made by carving, probably after most of the carving and chasing on the interior surface was completed. Finer details were created by chasing. There is no evidence that gilding was used, but the surface condition of the vessel is so deteriorated that if gilding were once present, it could have been totally lost.

The vessel has suffered much corrosion and has been subsequently cleaned on the inner surface and partially on the outer surface. Copper carbonate and copper oxide corrosion are present in many areas in addition to silver sulfide tarnish. More than twelve small textile fragments are attached to the surface;

these are partially covered by corrosion products. The textile was woven using a simple plain weave with approximately twenty-five to thirty threads per centimeter in the warp and weft directions. The threads have a Z twist and are composed of bast fibers.

## Composition

As determined by neutron activation analysis:

|  | PERCENT |
|---|---|
| Silver | 92.1 |
| Copper | 7.28 |
| Gold | 0.632 |

|  | PARTS PER MILLION |
|---|---|
| Iridium | 0.17 |
| Zinc | 52 |
| Tin | <14 |
| Arsenic | 88 |
| Antimony | 3.4 |
| Selenium | 3.7 |
| Iron | <3.0 |
| Cobalt | 0.94 |
| Mercury | 0.084 |
| Chromium | 0.52 |
| Scandium | 0.0012 |

## Notes

1. For the Boston example, see Simpson 1972, 120, colorpl. on p. 115. The example in the Abegg-Stiftung (acc. no. 8.3.63) is unpublished. These and several other references to comparanda for this object were kindly provided by Prudence Harper and Pieter Meyers.

2. Marshak 1986, pls. 23–28.

3. Koshkarli 1985, 59, pl. XIII.

4. Brunner 1978b, 91–92.

5. Other examples of the theme in Sasanian silver plate include a hemispherical bowl with exterior medallion encircling a ram wearing a fillet, in the Detroit Institute of Arts: Grabar 1967, 125, no. 41; in decorative stucco: Kröger 1982, 58, fig. 1; in seals: Harper 1973, 73–74; also Brunner 1978b, 92–94; Bivar 1969, pl. 16 (ram wearing fillet).

# 20

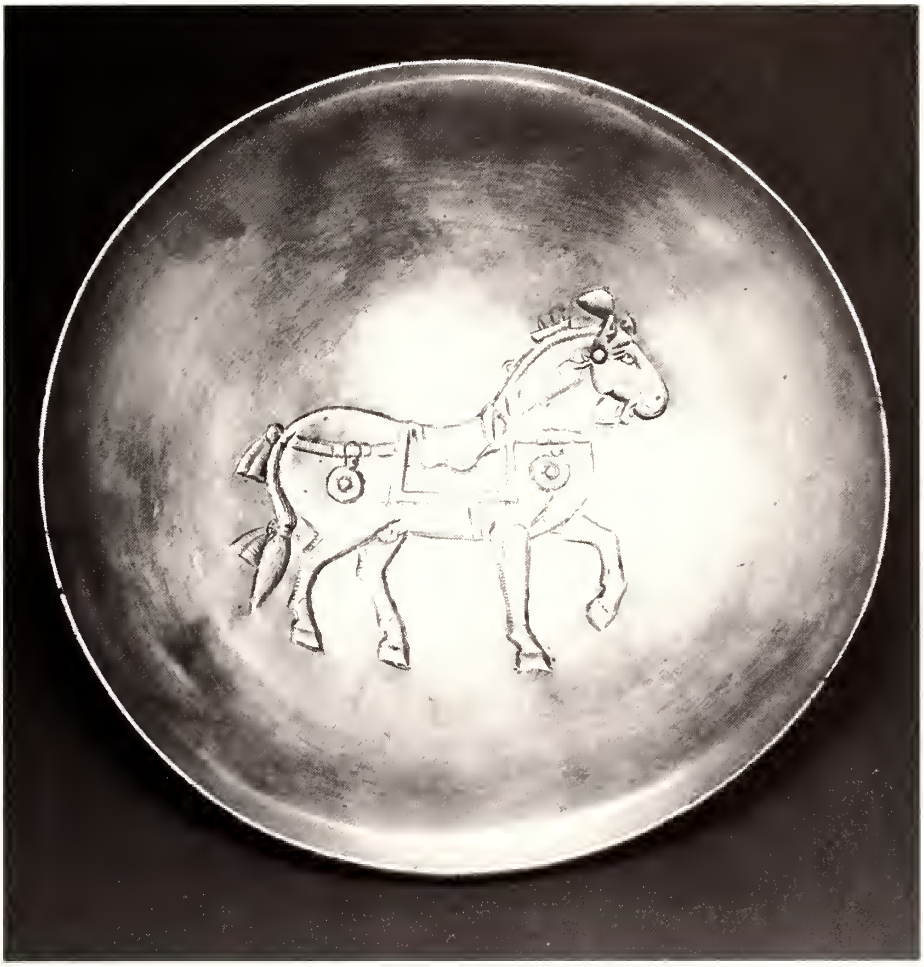
## *Plate*

6th–7th century A.D.
Silver and gilt: hammered, chased, carved, gilded
Height 5.5 cm
Rim diameter 21.8 cm
Weight 533 g

Arthur M. Sackler Gallery, S1987.123
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



ON THE EXTERIOR of this plate with low ring foot, shallow vertical flutes radiate from the base to the rim. In the interior center, carved in low relief and entirely gilded, a horse stands in profile, facing right. The animal has a topknot and crenelated mane and wears a blanket, saddle, and phalerae. Ribbons are tied to the top of the tail, near the end of the tail, and to the bridle.

Plates with fluted exterior and gilded figural decoration on the interior are a late type of Sasanian silver vessel [see also 18, 19, 21]. A single riderless horse is an unusual subject among Sasanian silver plate interiors. It is a theme found occasionally on Sasanian sealstones.[1] In Zoroastrian tradition the horse was considered in the family of beneficent grazing animals. Because of its essential role in the epic tradition, as reflected in Firdausi's epic *Shahnama,* the horse was closely associated with royalty and appeared, in the form of a protome, on princely headgear.[2] The presence of fluttering ribbons on the horse in the Sackler Gallery plate also connotes a royal association.[3]

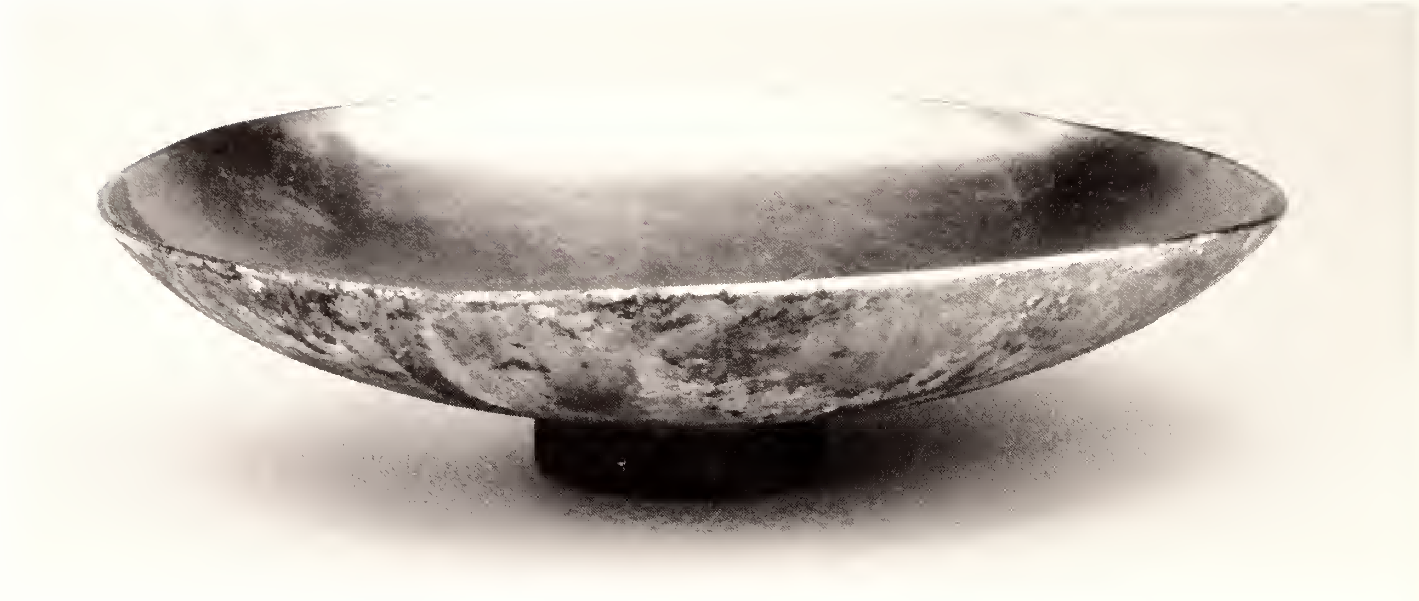
Rhyta in the form of a horse or horse's head, made of clay or of silver, are known from the Sasanian era.[4]

## Technical Discussion

Radiographs display the changes in density typically found with objects formed by hammering. The radial fluting on the outside surface appears to have been carved and then polished to achieve smooth, rounded flutes. The foot was formed from a band bent into a ring with the ends connected by a scarf joint.

The horse figure in some areas is only very slightly higher than the background. Overall, there is great uniformity in the thickness of the plate wall. The undecorated areas are about 1.2 millimeters thick, while the decorated portion varies between 1.2 and 1.4 millimeters. Amalgam gilding was applied after the chasing of details; thus the punch marks are filled partially and obscured by a rough, granular gold layer. Concentric lines are not present around the rim or within the ring foot.

The plate is in very good condition. Copper corrosion products cover most of the outside surface of the plate and a few minuscule areas on the inside surface. The foot is adhered to the body by a modern adhesive. Although the foot may not be original to the body, it bears corrosion similar to that found on the body and the other surface features of the two parts are also consistent with each other.



## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 85.7 | 47.6 |
| Copper | 13.6 | 52.1 |
| Gold | 0.594 | 0.315 |
| | PARTS PER MILLION | |
| Iridium | 0.099 | 0.054 |
| Zinc | 31 | 62000 |
| Tin | <15 | 7900 |
| Arsenic | 11 | 628 |
| Antimony | 3.6 | 211 |
| Selenium | 1.7 | 17 |
| Iron | <4.4 | 290 |
| Cobalt | 0.10 | 12 |
| Mercury | 0.031 | 0.15 |
| Chromium | <0.17 | <1.2 |
| Scandium | <0.0010 | <0.0074 |

## Notes

1. Bivar 1969, pl. 12; Noveck 1975, 80, no. 67 (standing horse with ribbons tied to neck); Brunner 1978b, 80–81.

2. Brunner 1978b, 80–81.

3. Compare the ribbons tied to the neck of the horse in the seal cited above, n1 (Noveck 1975).

4. Harper 1978, 29–30 (no. 1), 166 (no. 86), both with further references. A rhyton in the form of a horse's head, made of silver, is in the Louvre: David-Weill 1954, 157.

# 21

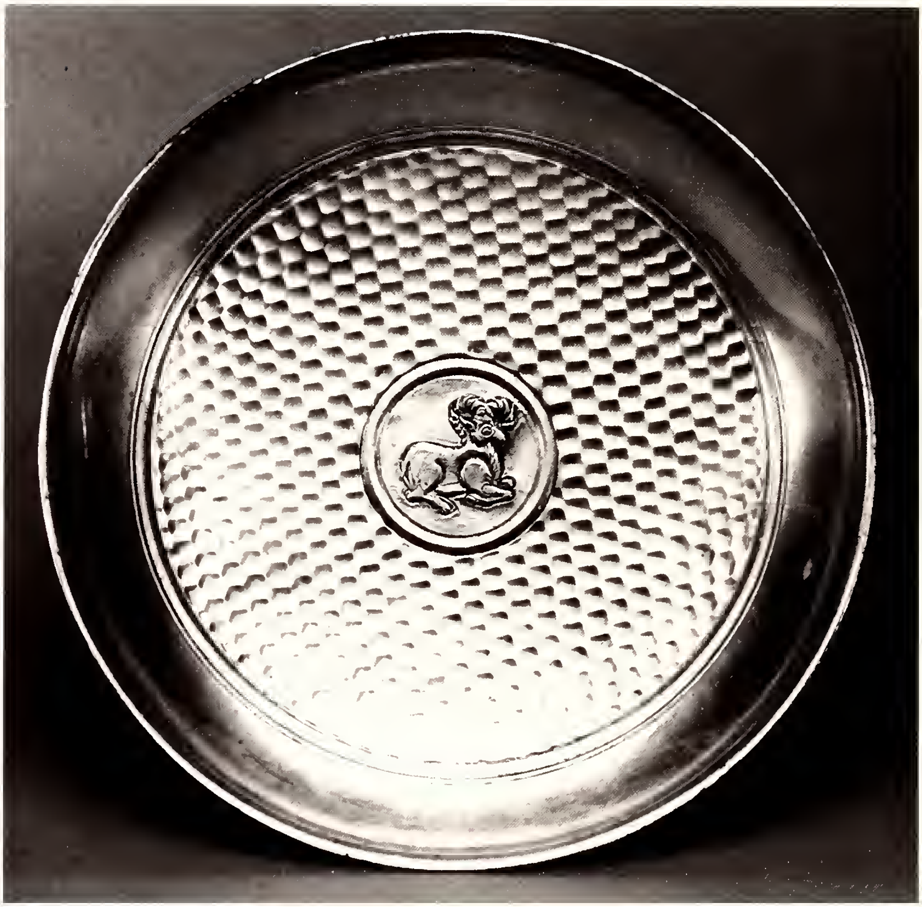
## *Plate*

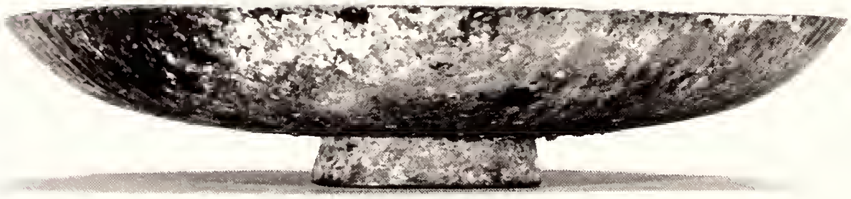
7th century A.D.
Silver and gilt: hammered, chased, carved, gilded
Inscribed within ring foot
Height 3.7 cm
Rim diameter 20.5 cm
Weight 490 g

Arthur M. Sackler Gallery, S1987.125
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

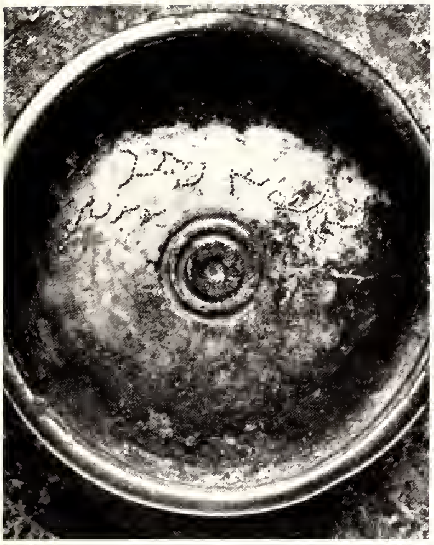
*Unpublished*





THE LOW RING FOOT of the plate is angled very slightly away from the center. Within the ring is a centering mark surrounded by two concentric circles; a dotted inscription is contained within the ring. From a line about one centimeter above the ring to the rim, the exterior is neatly fluted with vertical fluting, radiating from base to rim.

A narrow gilded band encircles the interior rim; the rim is slightly thickened. A second concentric gilded band rings most of the plate interior, which is almost entirely finished with a honeycomb pattern. In the center a small medallion, 5.0 centimeters in diameter, defined by a gilded band, encloses a



recumbent ram shown in profile facing right, carved in low relief. The horns, ear, and eye are neatly rendered and articulated. Two lines mark the right foreleg. Rows of tiny punched lines delineate the animal's fur.

The Middle Persian inscription within the ring foot names the owner and gives the weight of the vessel: *zwlp 'n S 30 W ZWZN 2*, "Zurwān [or Zōrbān], 30 *s[tēr]* and 2 *drahm*."[1]

This vessel is one of a group of late Sasanian silver plates with fluted exterior and gilded figural decoration on the interior, a type also represented by three other examples in the Sackler Gallery [18–20].

Decoration in the form of an animal enclosed in a medallion appears in the central exterior roundel of a silver bowl in the Detroit Institute of Arts.[2] A recumbent ram with a fluttering fillet, enclosed in a beaded or pearl medallion, is a design known from decorative stucco.[3]

The honeycomb pattern is unusual in Sasanian silver plate. It was probably inspired by the faceted surfaces of glass vessels, which were frequently decorated in this manner.[4] A painting on silk from Dunhuang, Gansu Province, northwestern China, dating to the eighth century, depicts a bodhisattva holding a Sasanian-type glass vessel. The painting gives a vivid impression of the translucent, shimmering qualities of the faceted glass, an effect that would also have been created by the reflective surface of the silver vessel.[5]

This plate has no parallels in the repertory of Sasanian silver vessels and is of considerable interest and significance as an example of the greater variety of design and decoration introduced in nonroyal workshops late in the Sasanian period.

## Technical Discussion

This plate displays the attributes of forming by hammering. The rim varies in thickness between 2.3 and 2.7 millimeters, while the raised areas of the design, roughly 1.3 millimeters thick, stand only slightly above the background surface, which is 1.15 millimeters thick. The honeycomb pattern on the inner surface was chased and the raised concentric bands enclosing the pattern were carved. The ram in the central medallion, concentric lines that set off the raised bands, and fluting on the outer surface were also carved. Details of the ram were chased. Amalgam gilding was used.

The foot was soldered to the body. The inscription inside the foot was chased using an irregularly shaped dot punch. Three concentric recessed lines are present on the exterior surface, one outside the foot where the fluting ends and two inside the foot. A centering mark is also present.

Textile pseudomorphs are present in the silver corrosion products. Traces of malachite (copper carbonate corrosion products) are also found. A heavy earth encrustation is present on the back; the front of the plate was similarly encrusted but was cleaned following its acquisition by the gallery. The plate is otherwise in very good condition and shows little wear.

## Composition

As determined by neutron activation analysis:

| | Plate | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 95.5 | 94.4 |
| Copper | 3.81 | 5.01 |
| Gold | 0.668 | 0.640 |
| | PARTS PER MILLION | |
| Iridium | 0.067 | 0.12 |
| Zinc | 60 | 49 |
| Tin | <17 | 40 |
| Arsenic | 1.0 | 0.41 |
| Antimony | 0.89 | 1.5 |
| Selenium | 0.85 | 1.0 |
| Iron | 1.3 | 16 |
| Cobalt | 0.057 | 1.4 |
| Mercury | 0.053 | 0.058 |
| Chromium | 0.060 | 0.076 |
| Scandium | <0.0012 | 0.013 |

## Notes

1. According to Philippe Gignoux, who kindly provided this reading and translation, the name presents some difficulties. Either it is a possible spelling for the well-known proper name Zurvan, or it could be interpreted as *zōr-bān* < **zāwar-pāna-*, "who protects strength."

2. Grabar 1967, 125, no. 41.

3. Ettinghausen 1972, pl. 25, fig. 85.

4. Harper 1978, 159, no. 82, with bibliography. Prudence Harper suggested the relationship of the silver honeycomb pattern to faceted glass.

5. Rice 1965, 216, fig. 205.

# 22

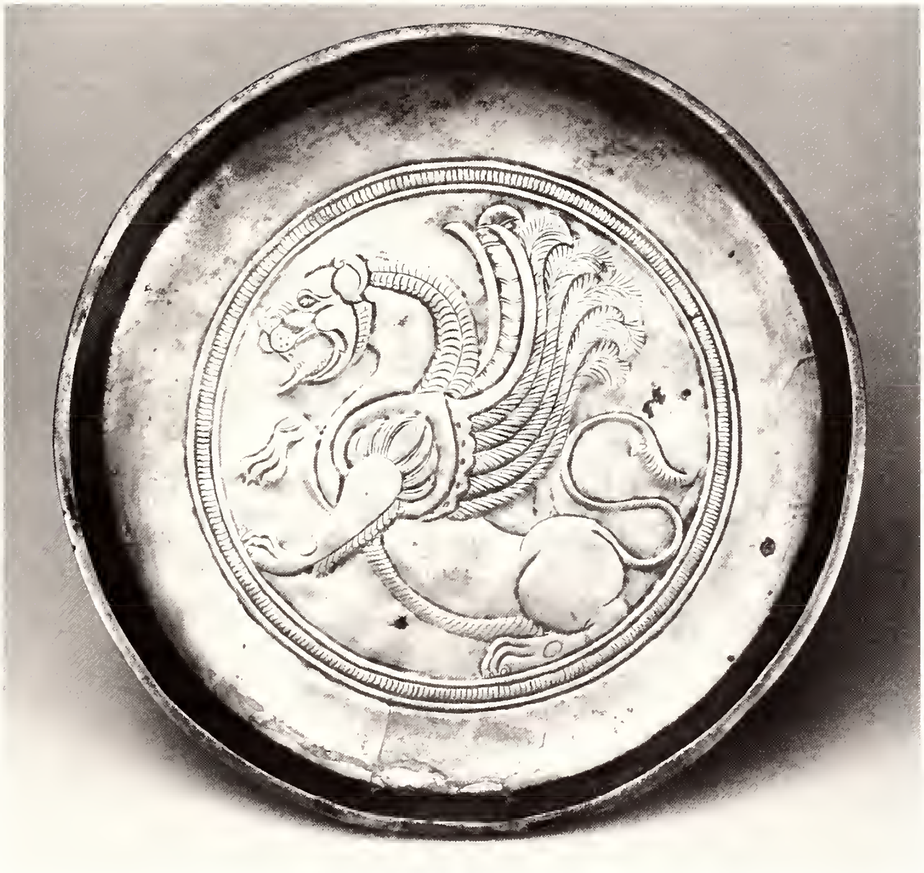
## Plate

7th century A.D.
Bronze: hammered, carved, engraved
Height 4.0 cm
Rim diameter 26.0 cm
Weight 799 g

Arthur M. Sackler Gallery, S1987.108
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



THE SIDES OF THIS PLATE with a flat base rise steeply to a flattened rim; the exterior is plain.

Within the interior, engraved bands—two plain bands on either side of a hatched band—define a large circular field. Circumscribed within the field, carved in low relief, is a winged female lion, in profile facing left. The tongue protrudes from the open mouth. Hatched bands emphasize the lower jaw, mane, and belly; the shoulder muscle is shown in a heart-shaped pattern enclosing flamelike tufts. A scalloped pattern appears at the base of the wing feathers.

In shape, material, and form of decoration, this plate resembles a seventh- or eighth-century plate in the Metropolitan Museum of Art, New York, the interior of which depicts a winged creature that may represent the mythical *senmurw* known from Persian legend and Avestan texts. The Metropolitan plate is also made of high-tin bronze but is considerably larger.[1] The type and arrangement of decoration—a single creature enclosed within a medallion formed by a rope border—are seen on a group of Sogdian silver-gilt plates of the eighth century.[2] Certain stylistic details, such as the scalloped edge along the base of the wing feathers and the patterned belly and mane, are also found on Sogdian representations.

The winged lion is a creature found on Sasanian stamp seals and on representations of textiles in Sasanian style.[3] No exact parallels for the female winged lion of the Sackler Gallery plate, however, are known to me from Sasanian decorative arts. The similarity in shape and decoration to seventh- or eighth-century Sasanian and Central Asian metalwork suggests a comparable date for the Sackler Gallery plate.

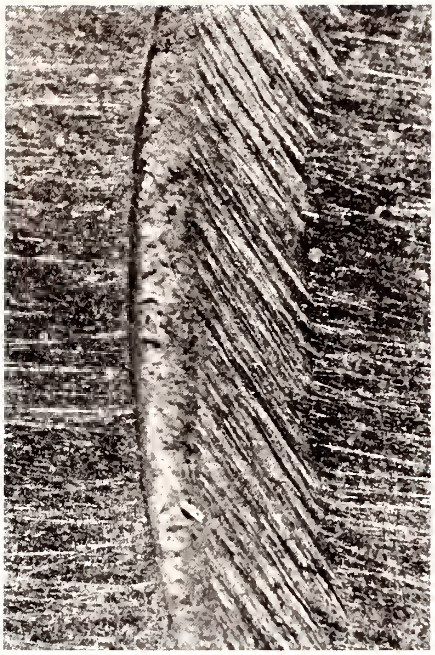


Fig. 1. Macrophotograph of an engraved line with a beveled, striated edge to produce the effect of shading.

## Technical Discussion

The plate is composed of a high-tin bronze containing virtually no lead. Radiographs reveal variations in density that are typical of an object formed by hammering. Moreover, evidence of the manufacturing technique is apparent to the unaided eye, as large polygonal grains in the metal, typical of some worked bronzes, can be seen on the polished and slightly etched surface. The nature of the bronze alloy is such that the vessel would have to be worked hot or after heating and quenching. Numerous cracks are found in the metal, testifying to the brittle nature of the alloy. A section of the side broke free along the cracks and was reattached using soft solder during a previous restoration. The etching of the surface may also be due to the restoration effort. Traces of an encrustation layer are present on the surface. An acidic solution may have been used to remove the encrustation, which at the same time etched the metal.

Details of the decoration were formed by engraving and carving. Even the small spots on the snout of the animal were cut out rather than punched. The avoidance of punching may be due to the smith's awareness of the brittleness of the metal. An interesting decorative feature is the outlining of certain parts of the animal to give the impression of shading. The effect was made by engraving the outline and then carving away the metal on one side of the line (fig. 1). Short, parallel scratches run perpendicular to the outline.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Copper | 79 |
| Tin | 21 |
| Lead | bdl |
| Iron | 0.1 |
| Silver | 0.04 |
| Antimony | bdl |

## Notes

1. Harper 1978, 94–96, no. 34 (diameter 36.8 cm).

2. Harper 1978, 95, with further references; also Marshak 1986, figs. 23–28.

3. Bivar 1969, 73; Brunner 1978b, 95.

# 23

## *Shallow bowl or boss*

4th–5th century A.D.
Silver, gilt, niello: hammered, carved, chased, gilded
Height 4.4 cm
Diameter, *rim,* 19.1 cm, *central medallion,* 6.9 cm
Weight 867 g

Freer Gallery of Art, 45.33
Purchased from Hagop Kevorkian, 1945

*Exhibited:* Iranian Institute of America, New York, 1940; Freer Gallery of Art, from 1947.

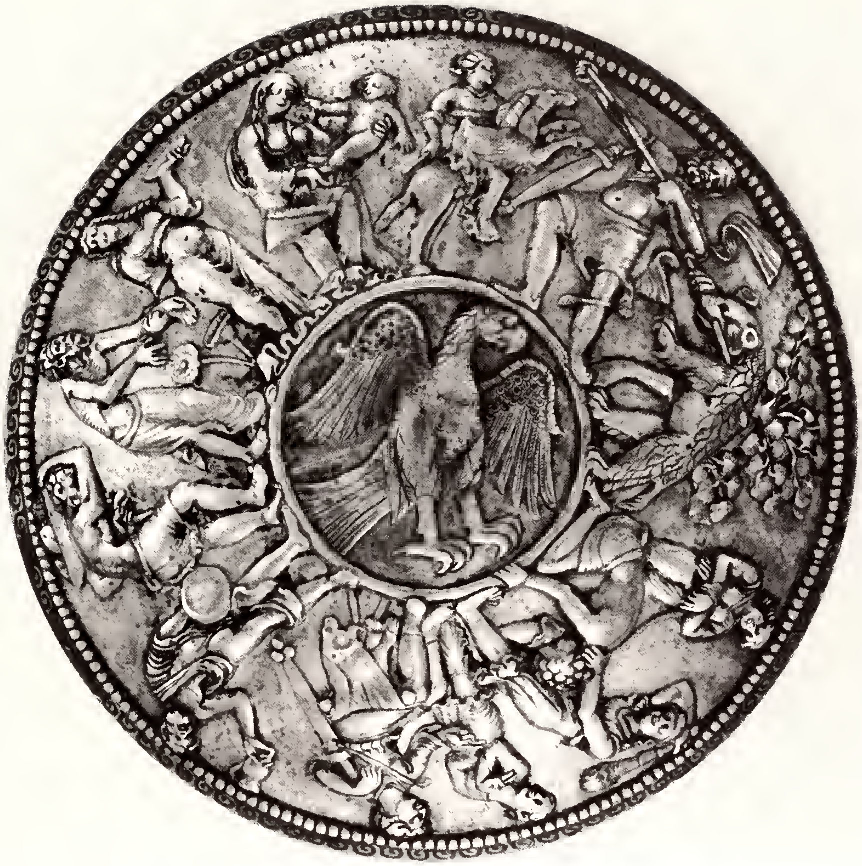
*Published:* Ackerman 1940, 325; Weitzmann 1943, 289–324; Atil 1971, no. 43; Denwood 1973, 126–27; Kron 1981, 362, no. 24; Boardman 1986, 836, no. 1688; Marshak 1986, 37, fig. 19; Linant de Bellefonds 1990, 457, no. 96.

THE VESSEL FORM is a very shallow hemisphere; the interior is plain. Around the outer rim is a pearl border surmounted by a wave crest inlaid in niello. A frieze of figures in high relief encircles a central medallion, which encloses an eagle in three-quarter view, facing right, its wings partly spread. The figures were originally at least partially gilded.

The figures in the frieze appear to be arranged singly, in pairs, or in groups. Orienting the bowl with the eagle upright, the figures can be described as (clockwise from upper right): a bearded figure, partly draped around his upper legs, spears a bear that stands in front of a leafy tree. One end of the drapery flutters to the right; the other winds around his torso and terminates in a lion skin at the back of the head. From his extended right arm hangs a sword with scabbard tip in a three-lobed form. The bear has grasped the blade of the hunter's spear and holds it in his mouth.

To the right are three figures that appear to form a self-contained scene. A draped (male?) figure clubs a male figure clad only in a loincloth, who kneels on the circular frame of the central medallion. Behind the kneeling figure stands a draped female figure, her hands bound by a rope, which extends to the neck of the kneeling victim. Just to the right of the figure holding the club are two figures whose heads are turned toward the clubbing scene. The figure on the left wears a tunic and trousers and is therefore probably male. To the right a male figure is seated on a chair over which is draped a lion skin. He wears a sword with a three-lobed scabbard tip, which is suspended from a balteus over his shoulder. Both figures gesture in the direction of the clubbing scene, holding the first two fingers outstretched, the thumb folded against the palm.

A bearded male figure, his drapery falling over his left shoulder and arm, stands in three-quarter view. He holds up a pitcher in his right hand and a circular object, perhaps a shallow bowl, in his left hand. To his right, turned away from him, is a male figure bent over, carrying a basket of fruit (?) supported on his back and what seems to be the curved end of a walking stick in his left hand.



Two figures, a bearded male figure and a standing female figure, stand to the right. The male figure is draped from waist to ankles, revealing an emaciated torso. He extends both arms toward the female figure, who grasps his left wrist. In her raised left hand she holds a shallow vessel. Her drapery is stretched tightly over stomach and leg and falls in catenaries between the legs. Lotus plants grow between the two figures.

A draped female figure, seated on a stool, carries a nude infant or small child in her arms. To the right is a draped figure, presumably male, riding a winged horse who leaps toward the hunter spearing a bear.

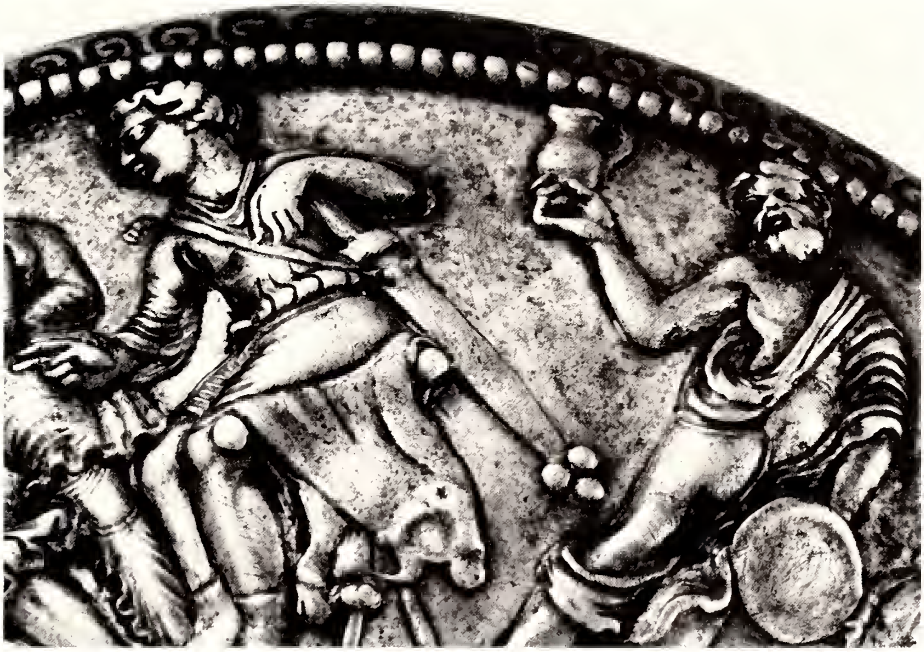
First shown at an exhibition of Persian art in New York in 1940, this bowl was purchased by the Freer Gallery of Art in 1945 from Hagop Kevorkian. Publications prior to 1945 and some after that date refer to the piece as the "Kevorkian" or the "New York" bowl. Although the object was allegedly found in northwestern India, no certain information on its modern history is available.

The bowl belongs to a small, narrowly defined group of silver vessels of "calotte" shape, decorated on the exterior with a frieze of figures encircling a central medallion. Three bowls of this type, including the one later acquired by

the Freer Gallery, were initially assembled and discussed as a group by Kurt Weitzmann, who argued that they all depicted scenes from the dramas of Euripides.[1] An alternative interpretation had been suggested by Phyllis Ackerman in the guide to the 1940 exhibition in which the later Freer acquisition was displayed. In 1973 a fourth bowl related to the group was published, and more recently a new classification and dating for the group has been proposed by Boris Marshak.[2] The history of scholarship on the vessels is in itself meaningful, as it encapsulates many of the difficulties of understanding the production, authorship, and interpretation of works of art in the hellenized East.

Ackerman described this bowl as a Graeco-Iranian work with strong Syrian influence, of Seleucid or Parthian date. She distinguished seven scenes on the frieze and suggested that the figures could be interpreted as divinities of the Graeco-Iranian pantheon. Thus the bearded man addressing a woman beside a lotus could be Verethragna talking to the goddess Anahita; the woman holding a young child, possibly the Mother of the Sun with the infant Helios-Hvar; the rider on the rearing horse was most probably the god Mithra.[3]

In 1943 Weitzmann published a detailed study of the bowl, discussing it together with two other silver bowls of similar shape and decoration in the Hermitage Museum, Saint Petersburg. Because of their shape and decoration, Weitzmann related the three silver vessels to the Hellenistic ceramic moldmade relief vessels commonly known as "Megarian bowls," the production of which began at the end of the fourth century B.C. or beginning of the third century B.C. and continued through Hellenistic and Roman times. Hellenistic ceramic moldmade relief bowls were sometimes decorated with scenes from Homeric and other epics and with scenes from the tragedies and satyr plays of



Euripides. They are generally thought to have been inexpensive replicas of gold and silver bowls of which only a few have survived. The ceramic and probably also the silver examples, Weitzmann argued, were inspired by the now-lost Greek originals.

Weitzmann discerned three groups of scenes on the Freer bowl, representing scenes from more than one of Euripides' plays: coherent scenes; single figures with no connection to the adjacent figures and which are apparently title heroes of dramas, shown in characteristic attitudes; and the bear-hunting scene.

In the first category is the group with a male killing a youth with a club. Weitzmann identified this scene as an episode from the *Mad Heracles* in which Heracles kills his second son with a club while his fettered wife, Megara, looks on. Heracles' lion skin is shown on the bowl as a kind of cloth headdress. In the drama Megara is not present when the second son is killed, and the artist has presumably conflated two separate scenes. Weitzmann identified the two figures next to the Heracles group as Theseus and Hippolytus, in a scene from the lost play *Hippolytus Crowned* in which Theseus confronts his son with Phaedra's accusation that Hippolytus was her lover. Theseus, wearing a sword, sits in a chair covered by a lion skin. The third coherent group on the bowl is from Euripides' lost play, *Peliades,* the contents of which are preserved by later writers, principally Diodorus Siculus (active first century B.C.). The two figures in the upper left illustrate a scene in which the old Pelias is killed by his daughters after Medea has convinced them that he would thereby be rejuvenated. The old man and his daughter are shown, and she is holding a libation bowl for the sacrifice.

In Weitzmann's second category is the title hero of *Bellerophon,* shown rid-

ing his winged horse Pegasus. To the left of Bellerophon, a woman holding a small child is identified as the title heroine of *Hypsipyle,* a partially preserved drama concerning Hypsipyle, the daughter of Thoas, king of Lemnos, who is nurse to Opheltes, son of Lycurgus, king of Nemea. Weitzmann tentatively identified the male figure bent over and carrying a wicker basket as the title hero of *Telephus,* a drama known only through fragments, in which the king is disguised as a beggar. Finally, the standing male figure holding a pitcher and drinking vessel is the title hero of *Aegeus,* another drama of which only fragments are known. The old Aegeus is shown about to poison his son, Theseus.

The only scene in Weitzmann's third category is the bear hunt, which he did not identify as an episode from a Euripidean drama. Weitzmann considered that it might represent a mythological scene, but he preferred to explain the scene as one taken from a bowl decorated exclusively with hunting scenes. When the design on the hemispherical prototype was converted to the more flattened shape, Weitzmann suggested, additional space was introduced that needed to be filled. The figure wears a lion skin, a detail not described by Weitzmann, and could therefore be identified as Heracles. A combat with a bear, however, is not among the labors of Heracles. Beginning as early as the third or fourth century A.D., bears are occasionally depicted as the quarry of royal hunters on Sasanian silver-gilt plates.[4]

A fourth bowl, clearly related in shape and decoration to the three discussed by Weitzmann, was published in 1973.[5] Its modern provenance is allegedly Tibet, but its original place of manufacture and modern history, like that of the others in the group, are unknown. The bowl resembles the Freer example in aspects of form and composition, but in other respects it is very different. Figures are clearly separated by extensive foliage, whereas the figures and scenes on the Freer bowl lack any divisions. The Tibetan bowl also

has a more pronounced, although still low, ring foot. Since there is no mention of gilding for the bowl of recent Tibetan ownership, it may have been made in a different technique. Alternatively, modern cleaning may have removed any traces of gilding. The figural decoration on the bowl of recent Tibetan ownership is not closely related to the Stroganov, Kustanai, and Freer bowls originally grouped by Weitzmann. Unlike those three, with their varied figural friezes representing action, the figures on the Tibet bowl are all standing male figures, separated from one another by trees with sinuous trunks. Philip Denwood, who published the bowl, argued that the figures illustrate an episode from Homeric epic. If so, the subject and style of narration depart considerably from that of the other bowls.

The Freer bowl differs from the others in the group in several respects. First, niello is employed in its decoration. Second, it is the shallowest and may not have been intended for use as a bowl (it could have functioned, for example, as a shield device). Third, the low ring foot encircling the central medallion becomes part of the composition on the Freer piece; this ground line is used imaginatively, even illusionistically, as part of the figural composition. The figure being beaten by a club kneels on the ground line and grasps it in his left hand. Yet the object clearly resembles in type and form a group of

vessels bearing exterior frieze decoration surrounding a central medallion, of a shape more comfortably described as a bowl.

The figures on the Freer bowl are clearly inspired by Greek art, and Weitzmann's identifications are for the most part convincing. The weakness of his interpretation is that it depends on reference to lost originals. It is doubtful that the sources for the silver bowls can be as explicitly identified as Weitzmann suggests, and the artisans may well have been drawing on figural models not well known to us. Any stylistic or iconographic detail that did not fit the hypothetical prototype Weitzmann explained as a "misunderstanding" or an "oriental deviation." While the work may have been executed by a Bactrian metalsmith who misunderstood its Greek original, it is also possible that an intentional ambiguity or conflation of sources was created to accommodate the taste of the patron. The differences in style among the four silver vessels, within an overall similarity in shape and decoration, suggest that they were commissioned as individual works.

Most authors have dated the silver bowls between the first century B.C. and the first or second century A.D. Boris Marshak has convincingly proposed a later date, in the fourth or fifth century A.D., citing Sasanian and Gupta elements in style and iconography. The fluttering drapery of some figures, for example, suggests Sasanian influence; the frail, elderly man, the influence of ascetic representations from the art of Gupta India.[6] Certain iconographic details, such as the form of the weaponry depicted on the bowl, may also supply chronological clues. The swords worn by two of the figures, for example, have three-part, cloverlike tips. This form of scabbard tip seems to have had a Roman origin but was not widely introduced in Sasanian representations before the fourth or fifth century.[7] Although the four bowls differ significantly in style, they are sufficiently alike in type and inspiration to be relatively close in date and artistic home. A source in Bactria, while it cannot be proven, remains a plausible hypothesis and would account for the presence of Kushan and Gupta elements of style and iconography observed by Marshak. If a Bactrian home for the group can be accepted, the alleged provenance of the Freer bowl in northwestern India gains credibility.

A redating of this group of bowls to the third to fifth or even sixth century raises interesting new problems concerning the continuity of tradition with earlier Greek iconography and style. A silver-gilt ewer of Sasanian type, decorated with repoussé figures, was recovered in 1983 from a Chinese tomb of the Northern Zhou dynasty (A.D. 557–81) and may provide an important clue to the problem of artistic transmission. The figures on the ewer are clearly indebted to Classical Greek forms and styles and have been interpreted as an illustration of the Judgment of Paris.[8] If the ewer was made in Central Asia, as seems likely, it would provide additional evidence for the continuity of Greek artistic forms in that region.

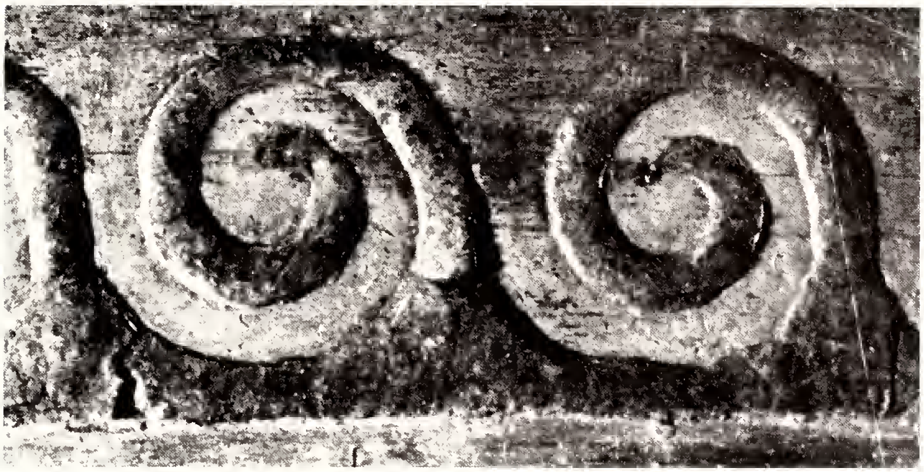


Fig. 1. View of niello wave crest.

## Technical Discussion

The basic form and decoration were created by hammering and carving. The variations in the density of the metal seen in radiographs are not strongly indicative of the use of hammering, but the methods employed to decorate the bowl are typical of those found on hammered vessels. A confusing feature is that one area of the surface bears what appear to be dendrites (a feature typical to cast metals), but this may be a corrosion effect.

Radiography also shows clearly a sharp outline around the figures, which would seem to be due to engraving or carving. Certain details are extremely sharp. Two such details are the long, vertical lines on the wings of the bird and leaf-shaped sections of fur on the bear. The background also appears to have been recessed by carving away the metal.

Microscopic examination of the wave crest reveals a number of features that do not conform with the typical attributes of niello. The profile of the wave crest is rounded and raised slightly above the surrounding surface. The curve of a wave is composed of separate overlapping pieces (fig. 1). The overall appearance then is that of applied inlay that stands above the surrounding gilded border. X-ray diffraction analysis confirms the use of niello, however, and it is composed of stromeyerite, a silver copper sulfide. Raised niello is rarely found in silverwork. One of the best examples of the use of raised niello can be seen on the Sasanian Peroz-Kavad I plate in the collection of the Metropolitan Museum of Art, New York.[9]

Although only traces of gilding still remain, it is almost certain that amalgam gilding was used due to the presence of mercury found by surface analysis using X-ray fluorescence. Also, none of the physical attributes of leaf gilding, such as loose or overlapping edges, were found. Deep scratches in the recessed areas of the outer surface and traces of copper corrosion suggest that the bowl once bore a heavy corrosion layer that was roughly removed.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 91.7 |
| Copper | 7.48 |
| Gold | 0.806 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.33 |
| Zinc | 210 |
| Tin | 650 |
| Arsenic | 130 |
| Antimony | 5.5 |
| Selenium | 1.2 |
| Iron | 25 |
| Cobalt | 0.53 |
| Mercury | 0.40 |
| Chromium | 1.7 |
| Scandium | 0.0037 |

## Notes

1. Weitzmann 1943.

2. Denwood 1973; Marshak 1986, 35–39.

3. Ackerman 1940, 325.

4. Harper and Meyers 1981, pls. 9, 20, 21. Brunner 1978b, 101, for other examples of the bear in Sasanian art and for the meaning of the animal in Zoroastrian tradition.

5. Denwood 1973.

6. Marshak 1986, 37. The ascetic figure on the Freer silver bowl may continue a development already evident in Gandharan art; for the ascetic Buddha, see Tissot 1985, fig. 127. Harper 1988a, 343 n. 36, suggests a sixth-century date for the bowl allegedly found in Tibet. A wave crest pattern encircles the neck of a ceramic amphora from Merv in Turkmenistan: Carter 1974, pl. XI, fig. 10.

7. Overlaet 1989, esp. 744.

8. The ewer is published in *Wenwu* 1985, no. 11: 1–20, pl. 1, fig. 23. Further discussions are found in Marshak and Wakou Anazawa 1989; also Wu Zhuo 1989; Carpino and James 1989.

9. Harper and Meyers 1981, pl. 17.

# 24

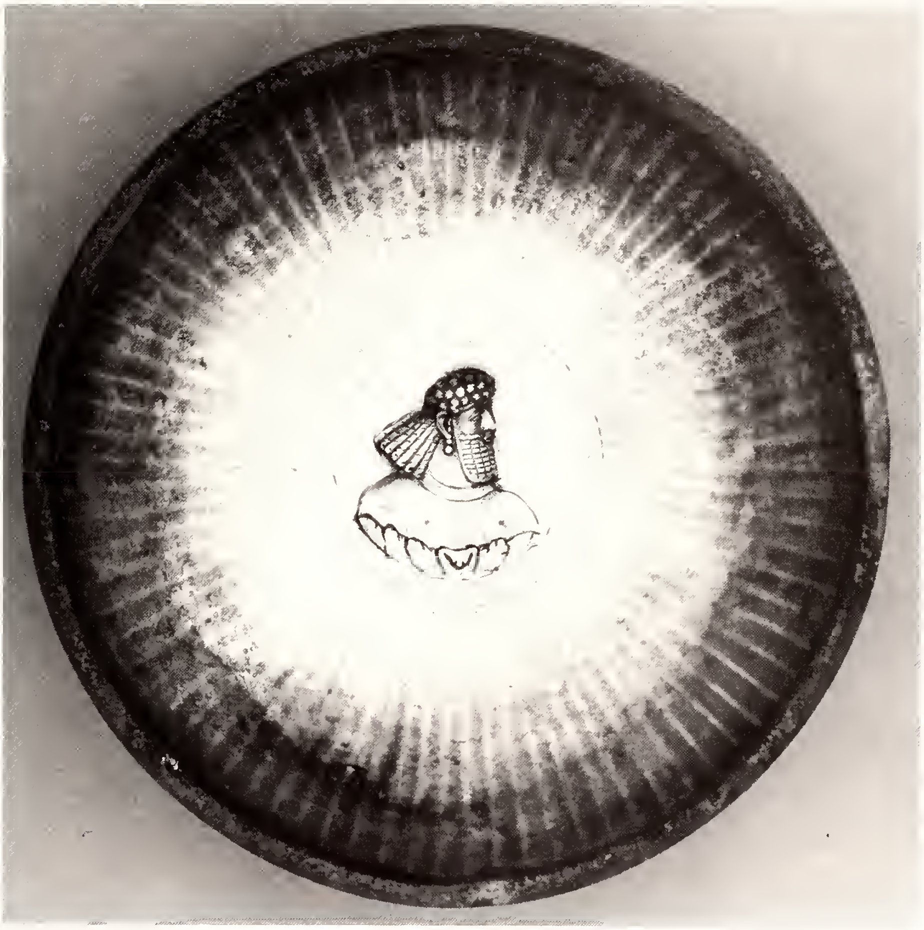
## *Bowl*

3d century A.D.
Silver and gilt: hammered, carved, chased, gilded; with cast and chased pieces attached by crimping
Height 6.2 cm
Rim diameter 21 cm
Weight 728 g

Freer Gallery of Art, 57.20
Purchased from the Kevorkian Foundation, 1957

*Exhibited:* Freer Gallery of Art, from 1958.

*Published:* Frye 1954, 143–44; Dimand 1959, 11–14; Atıl 1971, no. 45; Harper 1974, 65, 71–72; Harper and Meyers 1981, 166, pl. 4; Marshak 1986, 257.

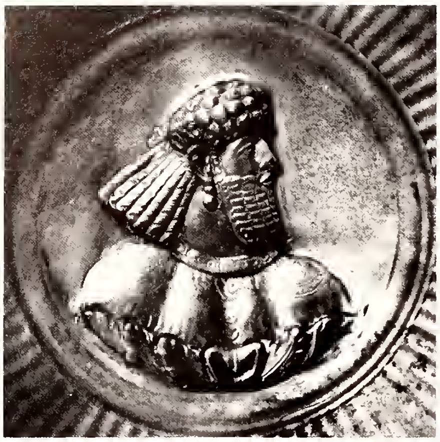


THIS FOOTLESS BOWL is of spherical form; the exterior is plain.

The interior is fluted in a radiating pattern extending from the central medallion to the rim. The medallion encloses a male bust, in profile facing right, placed above a stylized acanthus. The figure is bearded; his hairstyle consists of tight curls over the top of the head, above a diadem with knotted ends, and long curled locks reaching to the shoulder. He wears a beaded necklace and an earring with a bead and oval pendant. Elaborately patterned circular patches decorate the shoulders of the garment.

Traces of gilding are preserved on the outer rim of the medallion, diadem, necklace, and acanthus base.

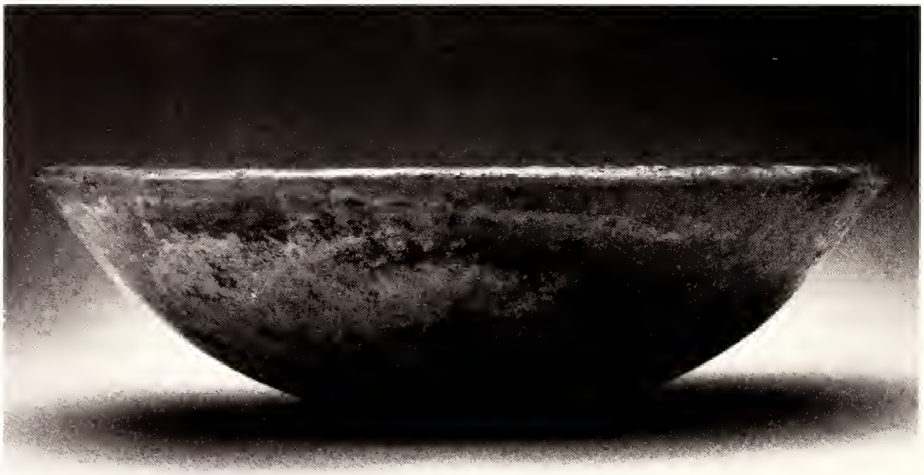
The Freer medallion bowl is one of four similar vessels allegedly found together, stacked one above the next, at a mound near Kermanshah in western Iran. It was first published by Richard Frye, who dated it to the Parthian period.[1] The three other bowls are now in the Cincinnati Art Museum, Metropolitan Museum of Art, New York, and Bastan Museum, Tehran. All four bowls are of similar deep form, without a foot, and contain a central interior medallion with a bust; the example in Tehran displays a female bust.[2]



A study of the four bowls by Maurice Dimand, published in 1959, reached conclusions similar to those of Richard Ettinghausen in his unpublished comments on the bowl made at the time it was acquired by the Freer Gallery. Both Dimand and Ettinghausen compared the figure on the Freer bowl with a solid-cast silver figure from a hunting plate, formerly in the Kaiser-Friedrich-Museum, Berlin, and certainly of early Sasanian date.[3] They also observed that the technique of manufacture of the bowls, with separately cast relief decoration attached to the interior surface, was typical of Sasanian silver vessel manufacture.[4]

Prudence Harper undertook a thorough reassessment of the four medallion bowls in her study of Sasanian silver vessels with royal imagery. She classified the four bowls with three other vessels, the principal decoration of which consists of a male or a female bust enclosed in a circular frame. Harper dated all seven medallion bowls to the period circa A.D. 250–350. She grouped the Freer medallion bowl with the bowl in Cincinnati and the Metropolitan bowl decorated with female busts on the exterior, noting that the closest parallels among dated monuments suggested a date for the three vessels in the reign of the Sasanian king Narseh (r. A.D. 293–302). She assigned the other two bowls of the four to a period some twenty years later, citing developments in the rendering of the drapery and acanthus base.[5]

A date early in the Sasanian period seems most probable for all the medallion bowls, although evidence for dating monuments in almost any medium is weak. Evidence from other sources, such as Roman portrait medallions and busts rising from a leafy calyx pattern, corroborates the dating to the late third or early fourth century. A stucco mold for a male head resembling the Freer medallion figure was recovered during excavations in 1965 and 1966 at Choche, an area of the ancient capital Ctesiphon, in a level probably dating to the fourth century.[6]



More problematic than the date of the medallion bowls is the identification of the figures depicted on the vessels. Linking the medallion bowls with vessels bearing royal images is a cup found in Sargveshi, Georgia, decorated with four medallion busts of which two are portraits of the Sasanian king Bahram II (r. A.D. 276–93).[7] The medallion form is also closely linked to the royal image as circulated on Sasanian coins. Yet only one of the seven medallion vessels, the cup from Sargveshi, depicts an identifiable royal figure. The most likely conclusion, as Harper has suggested, is that the personages on the medallion bowls are specific individuals of high rank, whose precise office or social position is indicated by details of hairstyle and costume.

## Technical Discussion

The bowl appears to be made up of three parts: the body of the bowl, head and neck of the bust, and shoulders and stylized leaves of the bust. Variations in the density of the metal, revealed by radiography, indicate that the shape was created by hammering. Carving appears to have been used to form the radial fluting and refine the shape of the rim, which flares out slightly and is thicker on the inside surface.

The two parts of the bust are joined at the collar. The head and neck were cast; radiography reveals that the piece is relatively thick and has an irregularly shaped cavity within it. The lower section of the bust may have been hammered to shape and worked from the front surface. The bust was secured to the bowl by crimping.

The head of the bust has deeply chased details; although cast, much tooling was employed to give the head its final appearance. While it is apparent that some tooling was executed before the insetting of the bust, it seems that extensive chasing was done after the bust was applied within the roundel. Most depressions left by the punches parallel the bottom surface of the bowl, indicating that the punch was struck while held perpendicular (or near perpendicular) to the center of the bowl. Amalgam gilding was used on various parts of the medallion.

The outer surface of the bowl is smooth and undecorated. A slight, recessed line in the form of an arc may be all that remains of what was once an engraved annular line around the center of the bottom.

The bowl is in generally good condition but has suffered rather severe corrosion. The rim and upper wall are rough due to the presence of a thick layer of silver chloride corrosion. A small break, now repaired, is present in the wall a few centimeters below the rim. The gilding and details on the bust are worn. Fine linear ridges on the interior surface of the bowl have lead to speculation that these may be dendrites left by casting the bowl roughly to shape.[8] The linear striations, however, appear gauzelike and run without interruption

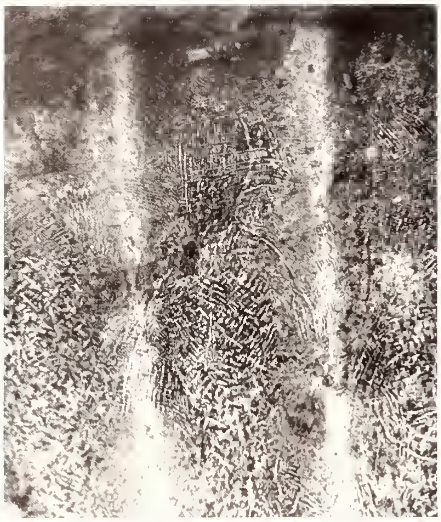


Fig. 1. Raised linear striations on inside surface of bowl.

across the radial flutes (fig. 1). Assuming that the flutes were shaped by carving, if dendrites were present, they would have been disrupted by the carving process. An alternative suggestion is that the linear ridges are the result of corrosion effects, perhaps due to contact with a textile over a prolonged period of time; no clear parallels of such an occurrence on ancient silver, however, can be offered.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 98.0 |
| Copper | 1.47 |
| Gold | 0.498 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.0013 |
| Zinc | 3.8 |
| Tin | <20 |
| Arsenic | 0.11 |
| Antimony | 0.14 |
| Selenium | 0.73 |
| Iron | <5.4 |
| Cobalt | <0.019 |
| Mercury | 0.55 |
| Chromium | <0.14 |
| Scandium | <0.0016 |

## Notes

1. Frye 1954.

2. Harper 1974, 65–79; Harper and Meyers 1981, 26–39. Another silver bowl decorated with medallions enclosing female busts is in the Metropolitan Museum of Art; the decoration is on the bowl exterior: Harper and Meyers 1981, 26–27.

3. The silver fragment was published by Sarre 1910. It is also illustrated in Harper and Meyers 1981, pl. 12.

4. Dimand 1959, 11–14.

5. Harper and Meyers 1981, 31–35.

6. Negro Ponzi 1967, 74–75.

7. Harper and Meyers 1981, 25, pl. 2.

8. Harper and Meyers 1981, 166.

# 25

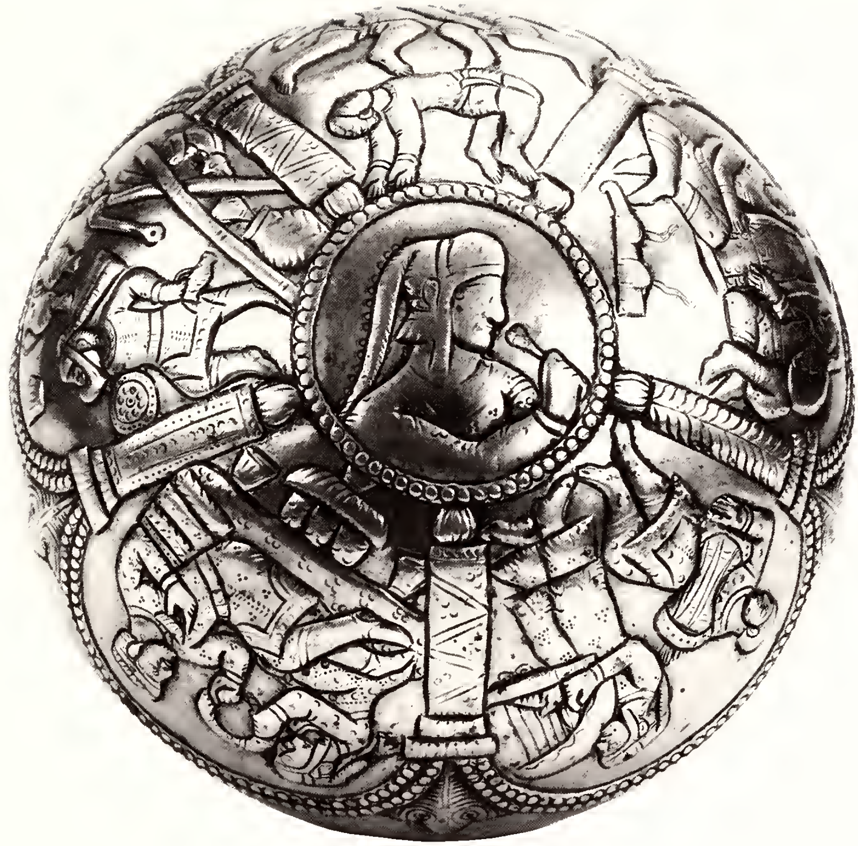
## *Bowl*

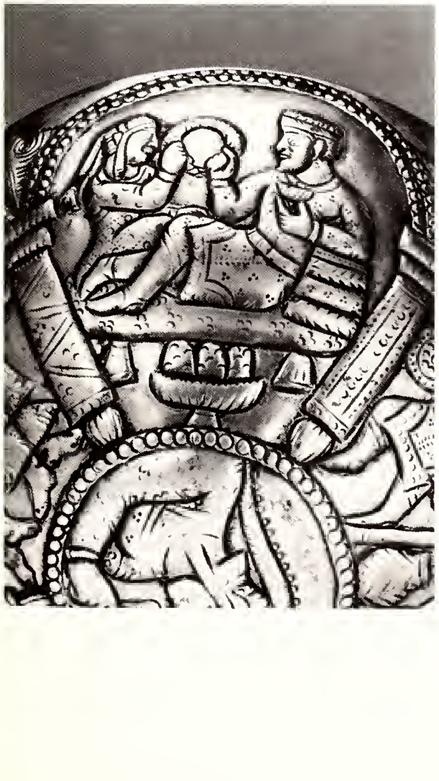
7th century A.D.
Silver and gilt: hammered, carved, chased, gilded
Height 5.7 cm
Rim diameter 14.3 cm
Weight 481 g

Arthur M. Sackler Gallery, S1987.105
Gift of Arthur M. Sackler, 1982

*Exhibited:* Asia Society Gallery, New York, 1978; Arthur M. Sackler Gallery, from 1987.

*Published:* Harper 1978, 74–76, no. 25; Gunter 1987, 45, fig. 11; Lawton et al. 1987, 55, no. 25; Gunter 1988, 44–45, fig. 27 and details; Gunter 1991, 13–14, fig. 4 and details.

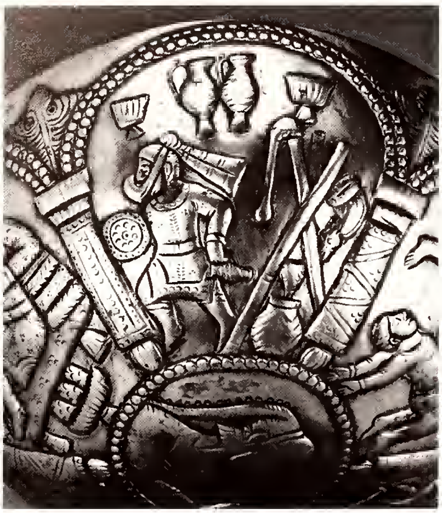




THE INTERIOR OF this small, hemispherical bowl is undecorated; the rim is plain. The exterior is entirely decorated with figures carved in relief with gilded background surface. Five figured scenes are each framed within arches formed by two rows of bead molding connected by decorated columns. A palmette rises above each column.

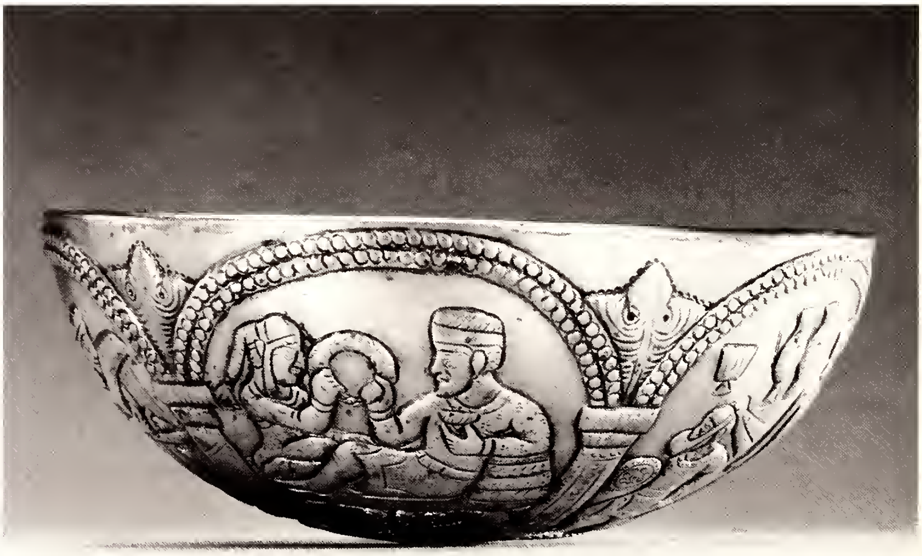
In the primary scene a male and a female are seated on a couch and grasp a wreath. Below the couch is a high-footed bowl containing food. In the scene to the right a servant with his face covered, holding vessels, approaches the couple. Above the servant are two ewers and two high-footed bowls; to the right is a stand for brewing beverages, from which hangs a rhyton with a fluted horn and caprid protome. In the third scene are two wrestlers; a third figure is shown below them. The fourth scene consists of two figures playing a board game, probably backgammon. The helmet and sword of one of the players are shown above and below the pair. In the final scene are two musicians: a male figure plays the drum and a female plays an arched harp. At the base of the bowl is a central medallion formed by a bead molding; it encircles the bust of a female figure holding a flower.

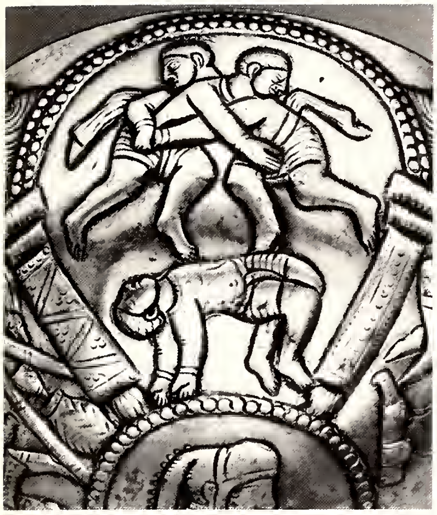
This unusual bowl was first published by Prudence Harper in 1978, and little needs to be added to her discussion.[1] The small, hemispherical bowl decorated

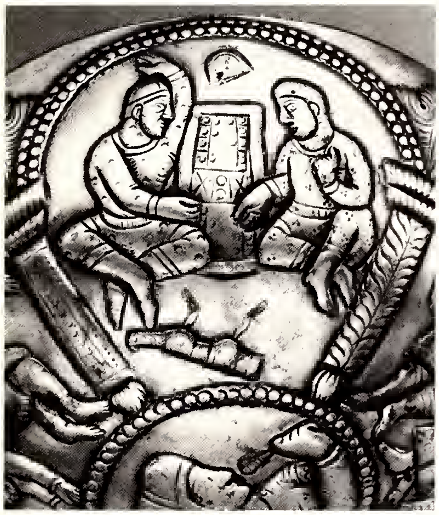


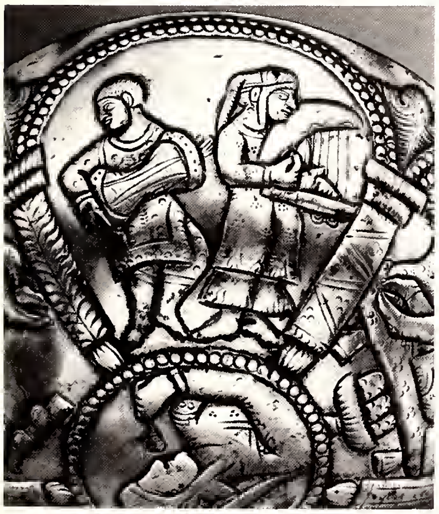
on the exterior with figures or with ornament derived from vegetal forms is a type represented in several museum collections. Its appearance late in the Sasanian period is consistent with the depiction on these vessels of human figures other than the king. Scenes of hunting and of activities such as wine making are found on other hemispherical bowls with human figures.[2] The Sackler bowl is exceptional in its rich, detailed decoration and in the content of the scenes illustrating the life of the Sasanian nobility. The subject of the bowl is the celebration of a marriage contract for the banqueting couple depicted in the main scene; the other scenes depict activities accompanying the celebration, thereby achieving a narrative unity.

The composition of the primary scene, with a male and a female banqueter seated on a couch, grasping a wreath or diadem, has close parallels in a Sasanian gemstone in the British Museum, London, and on silver plates in the Sackler Gallery collection [18] and Walters Art Gallery, Baltimore.[3] Other examples of silver plate dating to the late Sasanian or early Islamic period illustrate the theme of the banqueter accompanied by a servant and entertained by musicians. The servant with his face covered with a cloth in the presence of an honored banqueter appears on two silver plates of late Sasanian or early Islamic date, one in the Hermitage Museum, Saint Petersburg, and the other in the British Museum.[4] On these two plates, the figures of the banqueter, servant, and accompanying musicians are arranged in an interior tondo rather than in a series of individually framed scenes around the bowl exterior. More closely related to the Sackler bowl, with its exterior decoration arranged in a frieze around a central medallion, is a silver bowl now in the Hermitage. On









this vessel, known as the Stroganov bowl, is a seated banqueting couple accompanied by a servant holding a cup and ewers. To the right of the couple a pair of monkeys plays musical instruments (drum and flute). The Stroganov bowl is closely related to several other silver vessels bearing exterior figural decoration and thought to have been made in the region of Bactria between the third and fifth centuries.[5]

The pair of wrestlers in the adjacent scene is accompanied by a third figure placed below them. Harper has suggested that the third figure represents the defeated opponent; the scene thereby depicts the outcome of the wrestling contest.[6] A pair of wrestlers similarly locked in combat is shown on a small hemispherical bowl in the Cleveland Museum of Art. On the same bowl are represented musicians playing a drum, lute, and horn. The Cleveland bowl has also been dated to the late Sasanian period.[7]

The figures playing a board game that appears to be backgammon are unique in the repertory of Sasanian art. This scene is of great interest in light of the Middle Persian literary tradition describing the invention of backgammon by a wise man at the court of the Sasanian king Khusro I, "of the Immortal Soul" (r. A.D. 531–79).[8] Figures playing a board game, probably backgammon, are depicted in wall paintings preserved in private houses at the Sogdian city of Panjikent, dating to the seventh and eighth centuries.[9]

As pointed out by Harper, a number of stylistic and iconographic features of the Sackler bowl suggest a date late in the Sasanian period. The dress of the figures resembles that of courtiers depicted on reliefs in the Sasanian grotto at Taq-i Bustan in western Iran.[10] The ewers and high-footed bowl are types of objects belonging to the sixth and seventh centuries, as is the sword shown below the pair of backgammon players [see 26, 35–37].

The hairstyle of the female in the central medallion and in the banqueting scene is unusual: a long pigtail falls down the back of the neck and the hair is gathered in a mass, covered by a cloth above the forehead. A similar arrangement appears on the female banqueter in a Sackler silver plate [18], on a silver hunting plate in the Guennol collection, and on a silver bowl from northern India.[11]

Certain features of style and composition suggest that the Sackler Gallery bowl was influenced by artistic sources east of Iran. The relatively squat style of the figures on the bowl resembles those on a silver plate in the Bibliothèque Nationale, Paris, which has affinities with Central Asian metalwork of the sixth to eighth centuries.[12] The practice of decorating a bowl exterior with a frieze of figures surrounding a central medallion is most closely associated with Bactria and vicinity [see 23]. The placing of figures or scenes within architectural frames was a widespread compositional device in the first millennium, occurring on vessels made in the Byzantine world as well as on other categories of Sasanian silver vessels, such as vases and ewers [see 36].[13]

## Technical Discussion

The bowl was made with such great care that little evidence of manufacture remains. One explanation for the shaping of the bowl follows from measurements of the wall thickness at various points. The rim measures about 3.3 to 3.6 millimeters thick. Descending down from the rim, the thickness gradually decreases; background areas measure 2.5 millimeters just below the rim, 1.7 millimeters about 2 centimeters down, and 1.3 millimeters about 4 centimeters down. The thickness of the wall increases at the bottom of the bowl again, and the thickness at its center is 3.6 millimeters. These variations are typical of hammered forms. Also, the radiographic image of the vessel indicates some slight variations in density that resemble the effects usually seen in hammered pieces.

The interior of the bowl is almost perfectly smooth and concave with one exception; a slightly raised annular band echoes the opposing central ring on the exterior. The raised areas of decoration appear to stand well above the background, but this effect is due to their excellent execution. The curving rows of rings that reach the rim are equal to or slightly thinner than the rim. In fact, no raised area is thicker than the rim, and like the background, each decreases in thickness as one moves down the wall of the bowl. Raised details, such as the head of the king or the columns, stand only 0.5 millimeters above the surrounding background. The decorative details were almost all created by chasing. There are indications of engraving along the outlines of some figures and decorative details when the line is straight or gently curved; the more sharply curving sections of the outline were chased. The engraved and chased lines exhibit slightly different radiographic appearances, and under microscopic examination the engraved lines appear to be striated and have sharp edges. Microscopic examination also confirms the use of amalgam gilding.

Wear is evident over most of the surface, and some raised details have become muted, particularly the central medallion on which the bowl would rest when upright. The gilding has worn away in some areas. Traces of malachite (copper carbonate) and cuprite (copper oxide) corrosion are found in a few minute areas.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Silver | 93.5 |
| Copper | 4.5 |
| Gold | 0.7 |
| Lead | 0.7 |

## Notes

1. Harper 1978, 74–76, no. 25.

2. Other examples with figural decoration are in the Metropolitan Museum of Art: Harper 1979, 109, fig. 58; Cleveland Museum of Art: Harper 1978, 53–54, no. 14; and the Hermitage: Orbeli and Trever 1935, pl. 35.

3. Bivar 1969, 66, pl. 8, no. CF 2/120200. The Walters Art Gallery plate is illustrated in Grabar 1967, 100–101, no. 13. The theme of the banqueting couple is discussed in Carter 1974, 178–93, with bibliography.

4. Orbeli and Trever 1935, pl. 16; Dalton 1964, 66–67, no. 211, pl. XXXIX.

5. Marshak 1986, fig. 16. For a more detailed discussion of this bowl and its relatives, see references for [23].

6. Harper 1978, 74–75, describes this narrative technique as typical of Sasanian art.

7. Harper 1978, 53–54, no. 14. Musicians in Sasanian art are discussed in Fukai et al. 1984, 179–203.

8. The text and its probable historical and cultural setting are discussed in Brunner 1978a.

9. Bussagli 1963, 46.

10. Harper 1978, 75.

11. My thanks to Prudence Harper for pointing out this similarity. The Guennol plate is discussed in Harper 1978, 48–50, no. 12; and in Harper and Meyers 1981, 198–99. For a silver bowl reportedly from the Punjab, now in the British Museum, see Dalton 1964, pl. XXXIII.

12. Marshak 1986, 270, fig. 187.

13. Examples from the Byzantine world include a chalice from the Hama treasure, probably of early seventh-century date: Mango 1986, 76, with further references.

# 26

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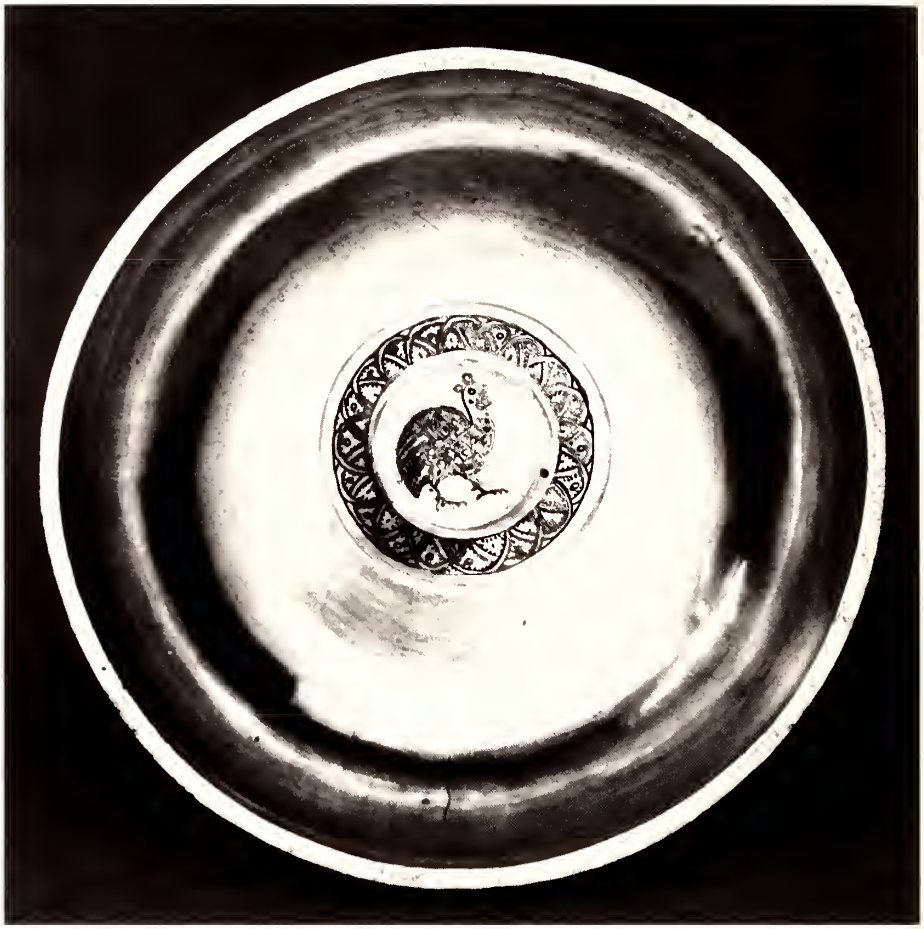
## *Bowl*

5th–7th century A.D.
Silver and niello: hammered, carved, chased
Height 10.1 cm
Diameter, *rim,* 17.9 cm, *foot,* 9.5 cm
Weight 497 g

Arthur M. Sackler Gallery, S1987.106
Gift of Arthur M. Sackler, 1982

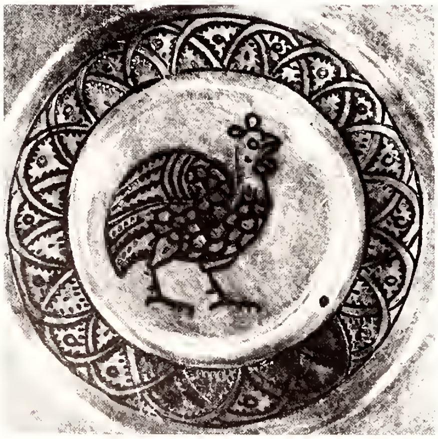
*Exhibited:* Asia Society Gallery, New York, 1978; Arthur M. Sackler Gallery, from 1987.

*Published:* Harper 1978, 44–45, no. 9; Lawton et al. 1987, 51, no. 22.



THE HEMISPHERICAL BOWL, with a flattened rim, rests on a high ring foot. On the exterior, vertical fluting begins below a plain band about one centimeter wide. The foot is plain, with a double chased band near the edge of the ring.

A central medallion in the bowl interior is formed by overlapping arches with interior hatching in niello inlay. The medallion encircles a peahen, in profile facing right, also executed in niello inlay.

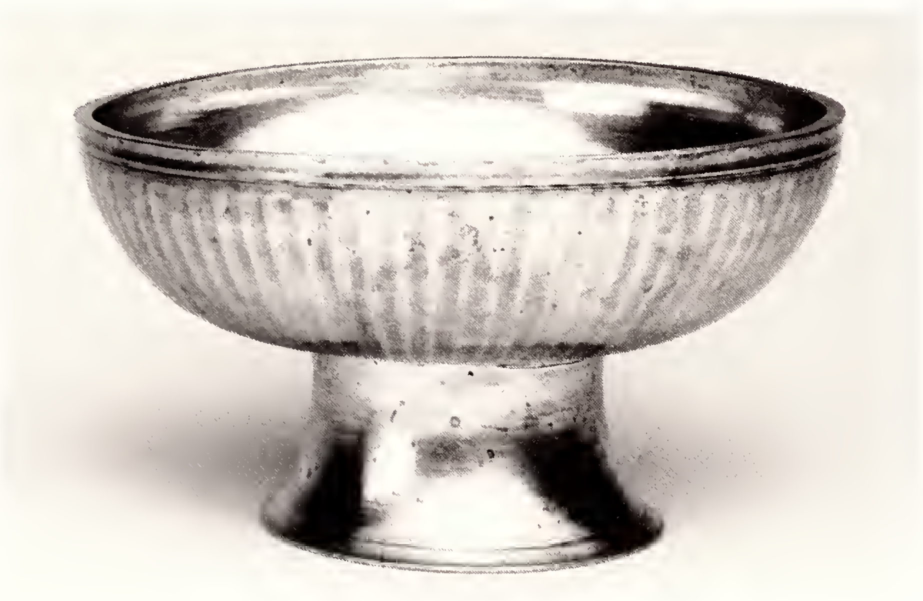


The high-footed bowl with a fluted exterior is a shape represented in examples made of silver, pewter, or high-tin bronze.[1] It is one of the few types of Sasanian silver vessel represented by an excavated example. The excavations of Jacques de Morgan at Susa in southwestern Iran produced a specimen of this shape, although without clear stratigraphic association.[2] High-footed bowls are occasionally depicted on Sasanian silver plate dating to the sixth and seventh centuries, suggesting that they were relatively common in the late Sasanian era and also providing evidence for their use in both secular and cultic festivities.[3] In representations the bowls are sometimes shown filled with fruit, and it is probable that they were used as serving vessels. The shape is derived ultimately from silver in the West, however, where it enjoyed a wide distribution during the Roman imperial period and in late antiquity. Well-preserved examples from the West demonstrate that these vessels were covered with close-fitting lids.[4] An example of the shape has also been found in a tomb at Datong, Shanxi Province, in northern China, closed in the year A.D. 501.[5] The high-footed bowl continued to be made, primarily in high-tin bronze, during the early Islamic period.[6]

Few Sasanian bowls of this shape preserve interior decoration. A chased peahen within a medallion ornaments the interior of a silver bowl in the Linden Museum, Stuttgart; this vessel is a close parallel for the Sackler bowl.[7] An example in the British Museum, London, has a chased pheasant enclosed in a medallion.[8]

The use of niello inlay for the interior decoration of the Sackler Gallery bowl suggests further evidence of Western influence for this particular example. Niello was seldom used in Sasanian silver plate, and most examples date from the end of the Sasanian period or to the eighth century.[9] In silver plate from the Roman and Byzantine West, however, it was commonly used—as on the Sackler bowl—to fill prepared areas of decoration, left flush with the surface of the vessel. A leaf design inlaid with niello decorates a silver dish in the Kaiseraugst treasure, dated A.D. 350–51.[10] A bowl of similar shape, with niello decoration on the interior, is a Byzantine work dated to the seventh century and assigned to a Syrian workshop; it is now in Geneva.[11]

In Zoroastrian tradition birds were closely associated with Ohrmazd, the great god and the power of good. Peafowl, both male and female, seem to have been symbols of court life in the Sasanian world.[12] Peahens are found as chased decoration on the interior of compressed elliptical silver bowls used for drinking wine.[13] The peahen appears on two pairs of Sasanian silver-gilt



roundels equipped with loops on the back, presumably used as articles of personal dress or ornament.[14] A pair of peahens is also represented on the interior of a Sackler Gallery plate [17].

## Technical Discussion

Radiographs clearly show an annular pattern of varying density in the metal, indicating that the vessel was shaped by hammering. Given its hammered form and slight impression of exterior fluting on the inner surface of the bowl, the fluting must have been carved. The interior surface is otherwise smooth and featureless, except for the central medallion and slight annular variations encircling it. The annular variations in the surface suggest the use of a lathe for finishing; the presence of what appear to be chatter marks in a number of areas also suggests that turning was used to some extent.

At a distance of 0.8 millimeters below the rim, groups of small vertical notches run annularly around the vessel (fig. 1). The notches resemble chatter marks but appear to be intentionally tooled. They may simply remain from the carving process, having been a preliminary step where crosscuts were made in the metal to facilitate its removal during the carving of the annular band below the rim. The prominence of the notches, however, strongly suggests that they were meant to play a decorative role.

The thickened rim of the vessel is sharp on the inside edge. With the exception of the rim, which measures between 4.3 and 4.6 millimeters thick, the vessel has extremely thin walls. Just below the rim, the wall is 1.5 millimeters thick, and at the point of greatest curvature the wall is only 0.6 millimeters thick. The foot is quite regular in thickness, averaging about 1.0 millimeter near the top and gradually increasing to about 1.8 millimeters at the bottom edge.

That the foot was soldered to the bowl is clear from radiographs and is

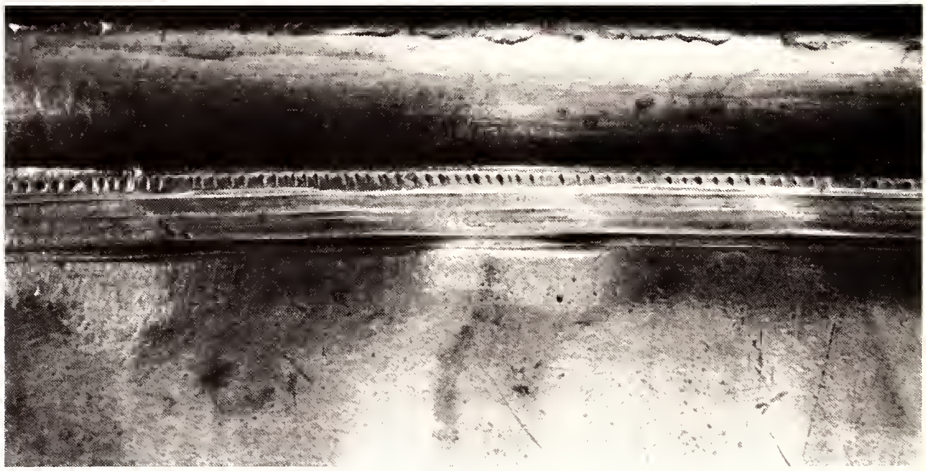


Fig. 1. Area under rim showing row of vertical notches.

also visible to the unaided eye. The forming method for the foot is not as apparent as that of the bowl. The foot has no seam, and a slight mottling in radiographic images suggests that it too was formed by hammering. Two fine, incised lines and one ridge encircle the foot. A centering mark is present on the bottom of the bowl. The central decorative medallion containing a peahen was chased, and niello, identified as the silver sulfide compound argentite, was set into the chased pattern. Gilding is not evident.

The bowl is in extremely good condition. Numerous signs of age are seen in its random wear and the presence of small cracks in the thinner areas of metal. Traces of copper carbonate corrosion are also present. These features, combined with the lack of other corrosion products and etched surface areas, suggest that an extensive cleaning and removal of corrosion layers occurred at some time in the past.

## Composition

As determined by neutron activation analysis:

| | Bowl | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 94.5 | 95.4 |
| Copper | 4.99 | 3.92 |
| Gold | 0.559 | 0.642 |
| | PARTS PER MILLION | |
| Iridium | 0.066 | 0.12 |
| Zinc | 99 | 18 |
| Tin | 69 | <20 |
| Arsenic | 11 | 12 |
| Antimony | 3.8 | 0.91 |
| Selenium | 1.5 | 1.6 |
| Iron | <3.0 | 3.6 |
| Cobalt | 0.11 | 0.079 |
| Mercury | 0.18 | 0.093 |
| Chromium | 0.13 | 0.98 |
| Scandium | <0.0012 | 0.00071 |

## Notes

1. Other silver examples, with plain interior, include: Ashmolean Museum (acc. no. 1971.416), unpublished (examined 1990); Metropolitan Museum of Art: Harper 1971, 510–11, pl. v, fig. 1. An example made of speculum metal is in the Los Angeles County Museum of Art: Moorey et al. 1981, 121, no. 707; another example is in silver: Moorey et al. 1981, 121, no. 708. A pewter example in the Metropolitan Museum of Art is illustrated in Harper 1978, 86, fig. D.

2. The bowl from Susa is in the Louvre: Amiet 1967, 278, fig. 9 (height 8 cm; diameter 15.3 cm; acc. no. Sb 6794).

3. Harper 1971, 510–11. See, for example, the hemispherical bowl [25]. A fluted vessel with a high conical foot is depicted in a relief at Taq-i Bustan: Fukai and Horiuchi 1969, pl. XXII.

4. Strong 1966, 204, pl. 66A, illustrates an example from the Carthage treasure, dating to the fourth to fifth centuries. A single-shell hemispherical bowl with ribbed exterior and concentric circles in the interior center, probably dating to the mid-fourth century, is in the Esquiline treasure: Shelton 1981, no. 15, pl. 19.

5. Ma Yuji 1983, 3. A group of high-tin bronze bowls of this shape is known from southern India; estimates of their date, however, range from the fifth to the twelfth century. The bowls are cited, with bibliography, in Harper 1988b, 156.

6. Melikian-Chirvani 1974, 133.

7. Kalter 1982, 27 D 13.

8. Barnett and Curtis 1973, 127, pl. LVIIIA; also illustrated in Kent and Painter 1977, 148, no. 312.

9. Harper 1983, 1128–29, with bibliography. Examples of late Sasanian or post-Sasanian date are in the Hermitage: Orbeli and Trever 1935, pl. 15 (hunting plate), pl. 46 (vase with female figures). Another example is a boat-shaped bowl with female tigers, inlaid in niello, on the exterior; the bowl is in the Norbert Schimmel collection: Harper 1988a, pl. IIb, c.

10. Oddy, Bimson, and La Niece 1983, 32, fig. 1. For interior decoration in niello in Roman silver plate of the third to fifth centuries: Strong 1966, 174, 194–96. I owe these references to Prudence Harper.

11. Lazovic et al. 1977, 24–25, no. 12 (the foot is similar; the vessel lacks exterior fluting). A set of three Byzantine silver plates with ring foot, decorated with central medallions consisting of monograms encircled by ivy scrolls, is dated by their stamps and inscriptions to the early seventh century: Mango 1986, nos. 103–5.

12. For the theme in Sasanian seals, see Brunner 1978b, 108; Bivar 1969, 101, HF 4, 5, pl. 22. For stucco, see Kröger 1982, pl. 14, figs. 4, 5.

13. Gignoux 1975, 273, no. 6, figs. 11, 12; also Harper 1988a, 338–40, items b (Museum für Islamische Kunst, Berlin), and m (Mohsen Foroughi collection).

14. Harper 1978, 62–63, no. 20, roundels in the Römisch-Germanisches Zentralmuseum, Mainz. Harper also cites an identical pair in Berlin: *Museum für Islamische Kunst* 1971, 37, no. 87.

# 27

## *Elliptical bowl*

6th–7th century A.D.
Silver and gilt: hammered, chased, repoussé, gilded
Length 27 cm
Width 12.8 cm
Height 4.5–7.3 cm
Weight 254 g

Arthur M. Sackler Gallery, S1987.111
Gift of Arthur M. Sackler, 1982

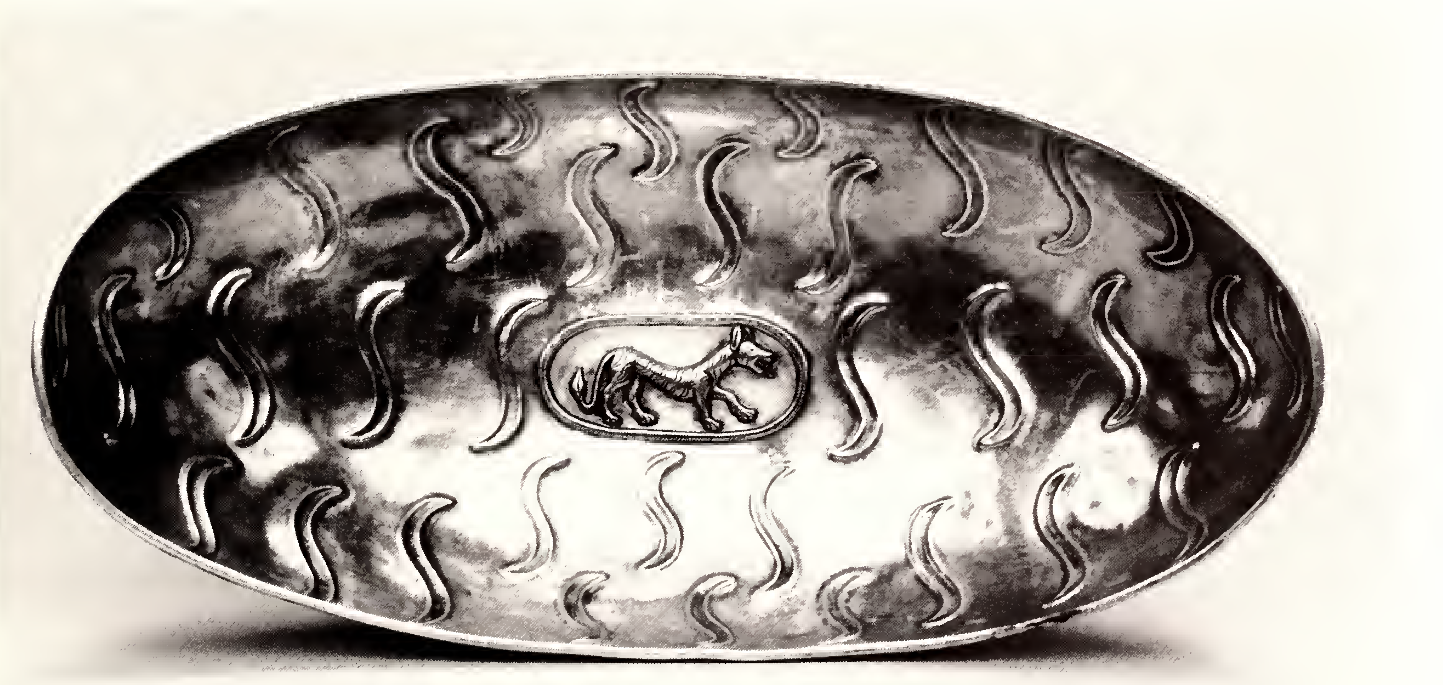
*Exhibited:* Arthur M. Sackler Gallery, from 1987.

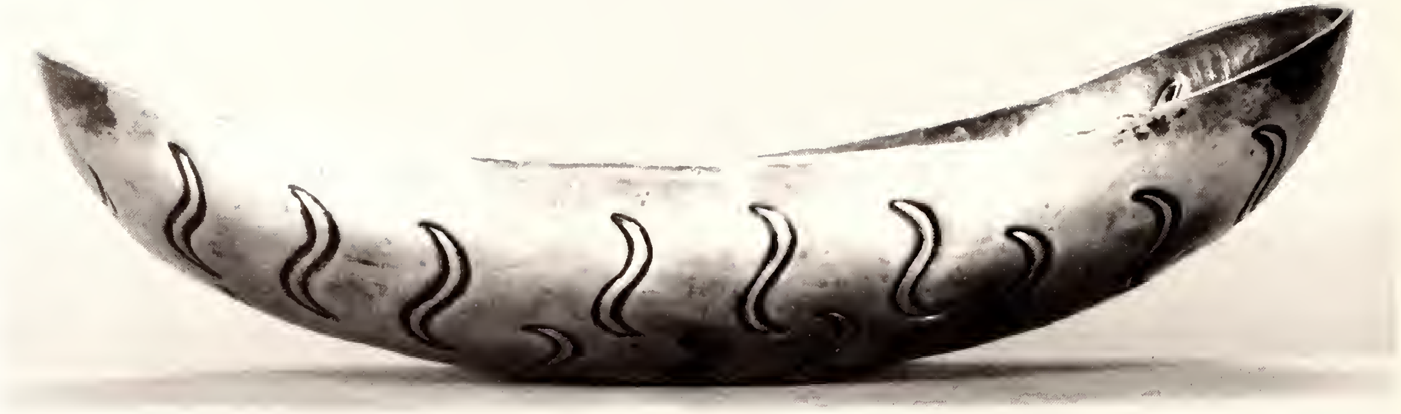
*Unpublished*

THE INTERIOR IS entirely decorated with raised wavy bands executed in repoussé and chasing; these bands appear as a recessed pattern on the bowl exterior. A central elliptical medallion, marked by narrow double hatched bands, encloses a tiger, in profile facing right; the fur is indicated by paired wavy lines. The vessel is gilded on parts of the decoration and on the background of the medallion, around the animal.

This bowl belongs to a group of elliptical bowls without a foot, a large category of Sasanian metal vessels reviewed in detail by Prudence Harper.[1] Several examples are decorated on the exterior of the vessel with single figures of felines. An elliptical silver bowl decorated on both interior and exterior is in the Museo Civico, Turin. On the interior is a hexagonal pattern, probably stamped; on the exterior petallike fluting radiates from a central rectangle framing a running tiger.[2] An example of a related subgroup of elliptical bowls, with a low foot and pointed ends, is in the Norbert Schimmel collection; on the exterior are running female tigers whose stripes are inlaid in niello.[3]

The wavy lines indicating the animal's fur resemble the rendering of a feline's fur on a silver plate of late Sasanian or early Islamic date, now in the Hermitage Museum, Saint Petersburg.[4] The wavy bands decorating the interior of the Sackler Gallery bowl resemble the rippled pattern on the exterior of two bowls of this shape, one in the Estate of Arthur M. Sackler and another in the Los Angeles County Museum of Art.[5] This rippled pattern, or curved fluting, also appears on the interior of a silver plate said to have been found in the





Punjab, now in the British Museum, London.[6] Jessica Rawson has observed that the pattern was an interpretation of the curved fluting used on late Roman silverwork and can be found on other examples from northwestern India and from Georgia as well as on a silver vessel found in a Chinese tomb dating to the Northern Wei period (A.D. 386–534).[7]

## Technical Discussion

The bowl was formed by hammering. A number of areas on the exterior surface are faceted, apparently due to the hammer blows employed to form the bowl. The raised decoration on the inner surface was executed in repoussé, with chasing utilized for details. Amalgam gilding was applied to selected areas of the design.

The condition of the bowl is very good. A few small dents and some corrosion effects are present. Traces of malachite (copper carbonate) corrosion are present in minute amounts. The surface is slightly etched due to corrosion, most notably along the edges of the gilded areas where the silver was attacked preferentially to the gilding.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 94.4 |
| Copper | 5.07 |
| Gold | 0.580 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.064 |
| Zinc | 17 |
| Tin | <28 |
| Arsenic | 3.0 |
| Antimony | 2.7 |
| Selenium | 1.7 |
| Iron | <4.4 |
| Cobalt | 0.050 |
| Mercury | 0.32 |
| Chromium | <0.16 |
| Scandium | <0.00090 |

## Notes

1. Harper 1988a, 331–45.

2. Harper 1988a, 334 n. 8, item f.

3. Harper 1988a, 341–42, pl. 11b, c.

4. Orbeli and Trever 1935, pl. 27. Compare also the similar rendering of fur on the panthers enclosed in lobed medallions in the stucco decoration on the Umayyad palace of Qasr al-Hayr al-Gharbi, Syria, from the second half of the eighth century: Sourdel-Thomine and Spuler 1973, pls. 45a, 45b, with further references.

5. Estate of Arthur M. Sackler, New York (acc. no. 86.2.39); Harper 1978, 47, no. 11 (the bowl was then in the Ruth Blumka collection). Moorey et al. 1981, 123, no. 711, for the Los Angeles bowl.

6. Dalton 1964, 58–59, no. 204, pl. XXXIII.

7. The vessel found in China in the tomb of Li Xisong at Zanhuang Xian, Hebei Province, is discussed in Rawson 1986, 33 with n. 5; 35, fig. 2. Harper 1978, 47, also noted the influence of late antique models on this rippled pattern on Sasanian silver vessels.

# 28

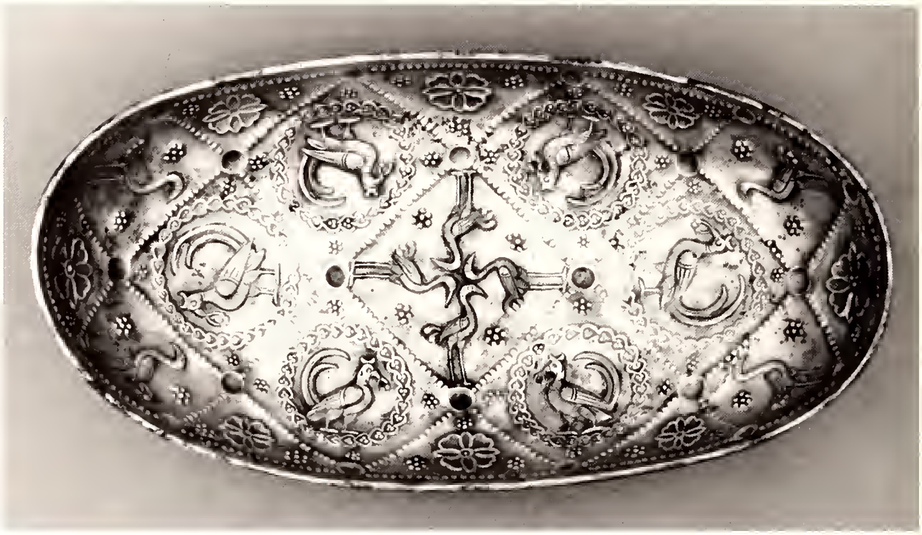
## *Elliptical bowl*

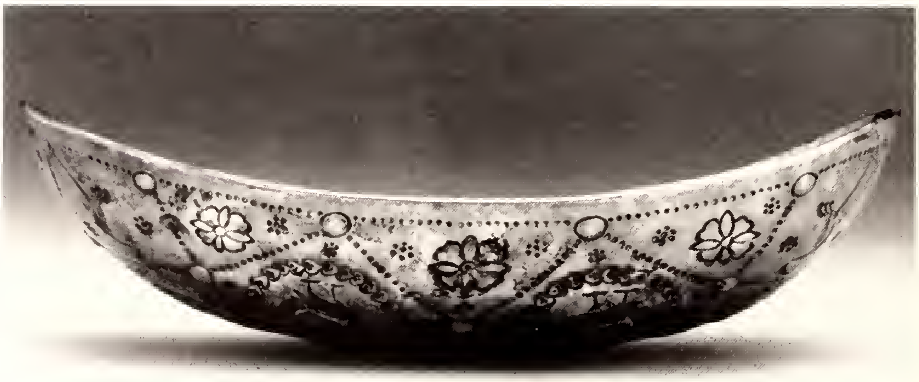
6th–7th century A.D.
Silver and gilt: hammered, repoussé, chased, gilded
Length 22 cm
Width 11.5 cm
Height 5.4 cm
Weight 227 g

Freer Gallery of Art, 1985.28
Purchased from Marion Hammer, 1985

*Exhibited:* University of Michigan Museum of Art, Ann Arbor, 1967; Freer Gallery of Art, from 1985.

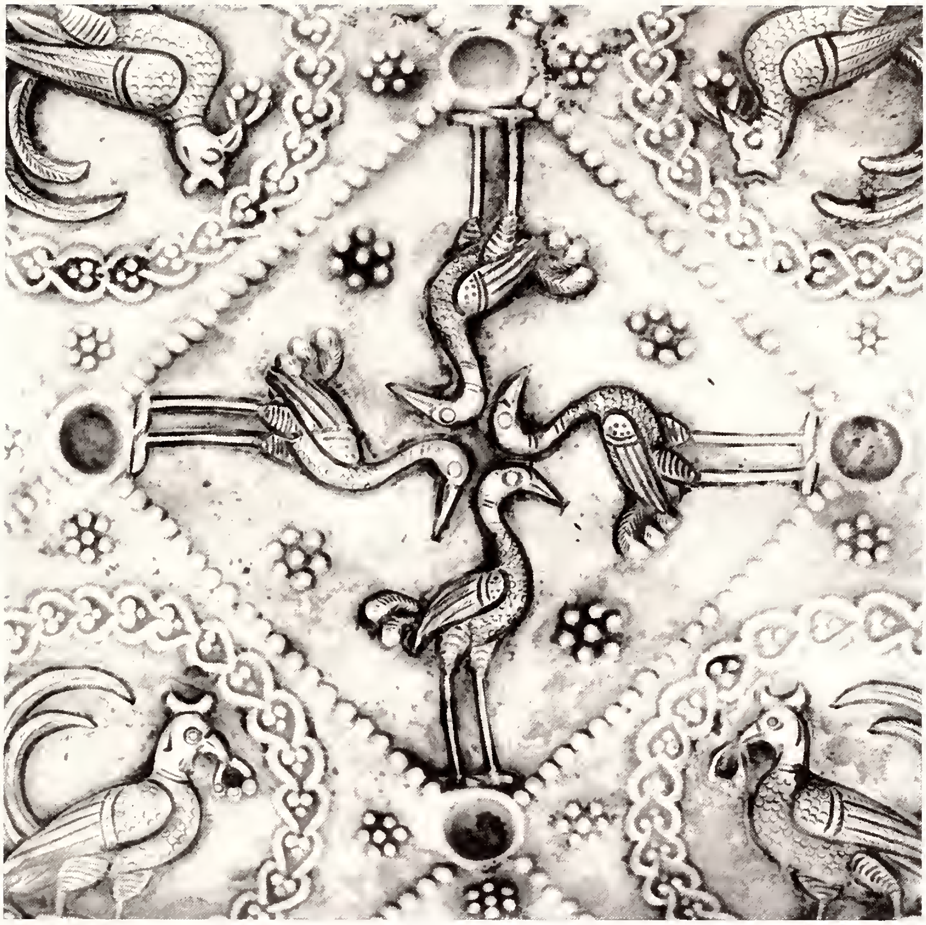
*Published:* Grabar 1967, 120, no. 35.





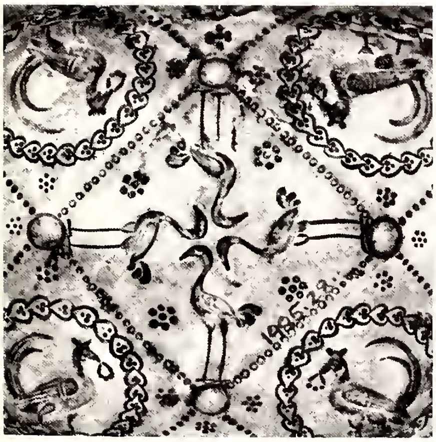
GILDED REPOUSSÉ DESIGNS with chased details cover the entire surface of the interior. Four long-legged birds with heads adjoining stand in the central interior; six birds with long curving tails and short bodies, enclosed by medallions, surround them. At either end of the vessel are birds similar to the long-legged variety in the central unit. Diamond-shaped compartments formed by repoussé dots divide the entire design. Rosettes fill the compartments around the edge of the interior. The raised interior decoration appears in recess on the exterior.

Elliptical bowls of this form are a well-attested type of late Sasanian silver vessel [see 27].[1] The closest parallel for the Freer bowl is an unpublished example now in the Los Angeles County Museum of Art.[2] A single, long-legged bird holding a plant tendril in its beak embellishes the interior of an elliptical bowl from Susa, one of the few excavated examples of Sasanian silver plate.[3] A bowl of similar form, decorated on both interior and exterior, is in the Metropolitan Museum of Art, New York.[4]



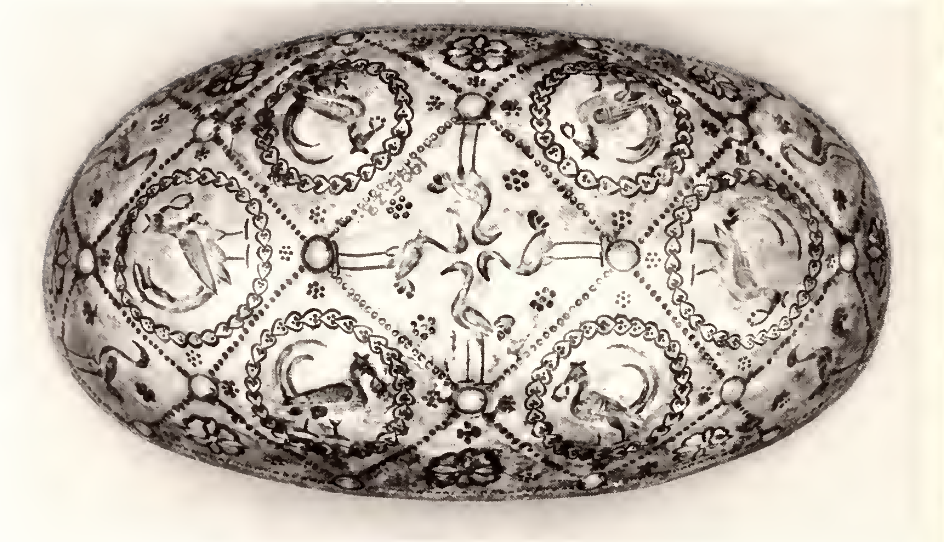
The organization of the decoration in diamond-shaped compartments is found on Sasanian silver vessels of other shapes, including vases.[5] Birds enclosed in medallions, forming a concentric pattern around a central unit, adorn a late Sasanian silver-gilt plate in the Hermitage Museum, Saint Petersburg.[6]

## Technical Discussion



The bowl was hammered from a single sheet of silver. After the form was shaped, the decorative elements were added by chasing and repoussé; toolmarks clearly indicate that the bowl was worked from the front and the back. Also present are scribed lines identifying the course of tooling; this feature is most clearly present along the row of bosses that follow the rim. Amalgam gilding was added selectively to the inner surface but no gilding was found on the outer surface.

Although the bowl is remarkable in that it has suffered no apparent deformation, other signs of wear and age are apparent. Random scratches are numerous over the entire surface. Finer parallel scratches suggest past abrasive cleaning. Magnification reveals an etched surface that may be the result of cor-



rosion processes that produced silver chloride corrosion. Small cracks and a small hole in the metal are also present. These features, combined with the results of analysis, where the gold and lead contents are consistent with expectations for ancient silver, argue strongly for the antiquity of the vessel.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Silver | 96 |
| Copper | 3 |
| Gold | 0.7 |
| Lead | 0.3 |

## Notes

1. Harper 1988a, 336–38.

2. Accession number M.76.174.8, information kindly supplied by Nancy Thomas and Pieter Meyers, Los Angeles County Museum of Art.

3. Amiet 1967, 277, fig. 8.

4. Harper 1988a, 333 n. 8, item e, with bibliography; the interior center is also decorated with a long-legged bird holding a plant tendril in its beak.

5. Orbeli and Trever 1935, pl. 40. The diamond or lozenge pattern is also found on Sasanian textiles: Carol M. Bier in Harper 1978, 129.

6. Orbeli and Trever 1935, pl. 29.

# 29

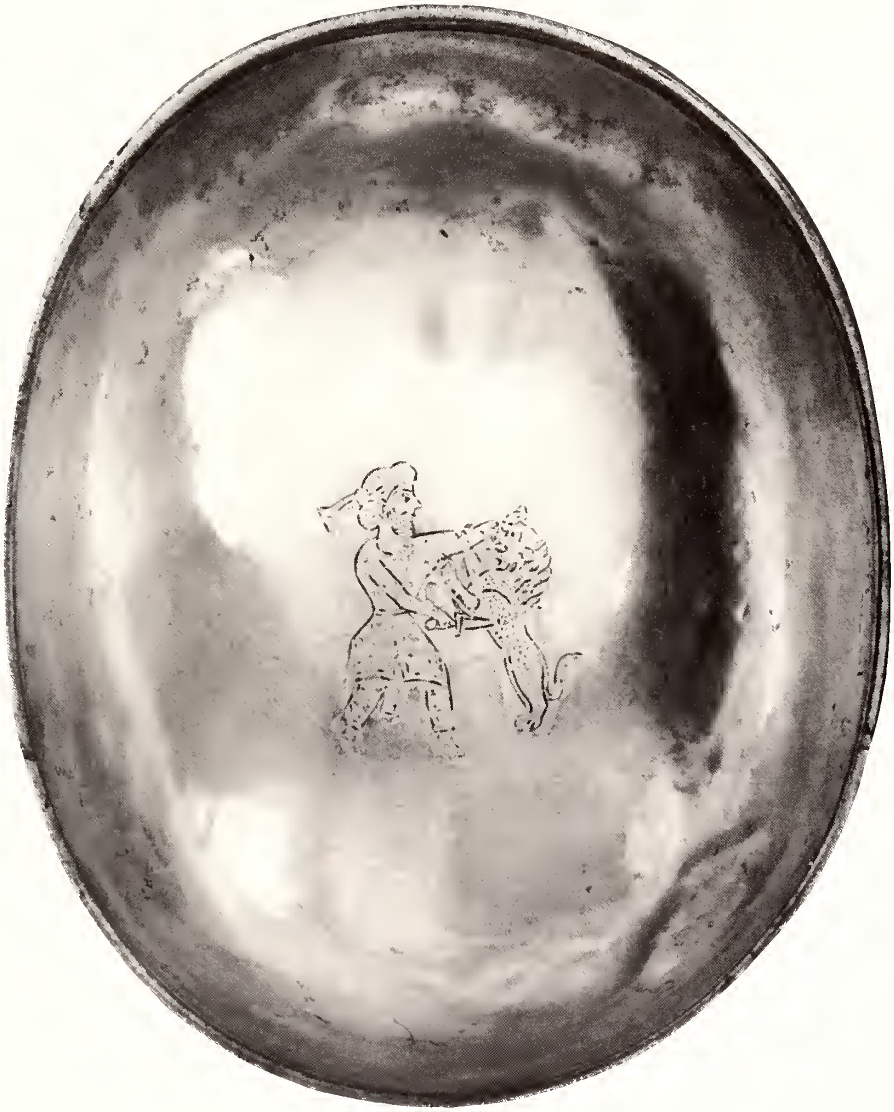
## *Elliptical bowl*

6th–7th century A.D.
Silver and gilt: hammered, chased, engraved, gilded
Length 18.2 cm
Width 14 cm
Height 5.1 cm
Weight 297 g

Arthur M. Sackler Gallery, S1987.143
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



THE EXTERIOR OF THIS small vessel is plain; the narrow rim is very slightly thickened on the interior. In the interior center, rather crudely engraved, is a standing male figure in Sasanian dress who, using a short sword or dagger, stabs an attacking rampant lion. Both figures are entirely gilded.

This vessel fits neatly into a category of compressed elliptical bowls represented in several museum collections; a number of examples have been assembled by Prudence Harper in her recent review of the group.[1] Examples made of silver and of copper alloys are preserved. A bowl of this shape, made of bronze, was recovered during excavations at the site of Qasr-i Abu Nasr in southwestern Iran, in association with material of late Sasanian and early Islamic date.[2] This group of bowls is of particular interest because a proportionately large number are inscribed with the names of owners and the weight of the vessel and also because at least one example has been recovered from controlled excavations in a context suggesting a late Sasanian or early Islamic date. Harper has observed that only this subgroup of the elliptical or boat-shaped vessels is decorated with Christian emblems, and she has suggested that some may have been owned by members of the Nestorian community in the Sasanian Empire.[3]

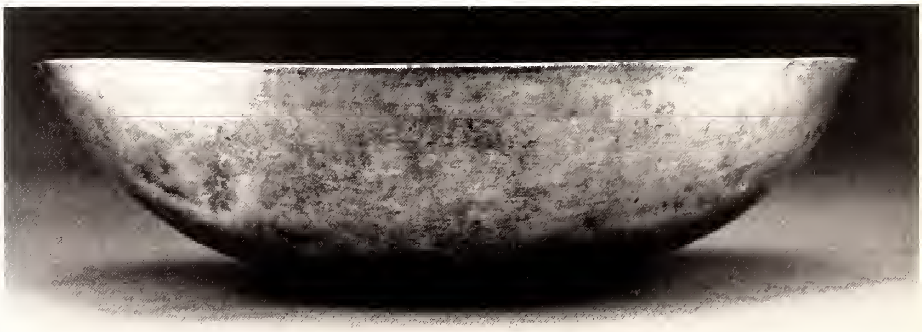
Several such examples display gilded figural decoration in the interior center. A monkey playing a pipe adorns an example in the Los Angeles County Museum of Art.[4] Another bowl, in the collection of Mohsen Foroughi, is decorated with a lion attacking a boar.[5]

The standing male figure stabbing a rampant lion is a motif best known from the royal art of the Achaemenid Empire, where it appears in monumental form on relief sculptures at Persepolis as well as on stamp and cylinder seals.[6] In the Sasanian period the motif is attested, although rarely, on silver plate and on seals.[7]

## Technical Discussion

The radiographic appearance of the vessel is quite mottled, indicating that the bowl was raised. In addition, the wall thickness varies in a manner typical of a hammered form. The metal is thicker at the center of the bowl (1.5 mm), thinner as the wall bends and turns up toward the rim (1.0 mm), and finally thicker again near the rim (1.8 mm). The rim is the thickest part of the vessel (2.5 mm); it is also rounded and delineated by an engraved line on the inner surface. Traces of gilding are found in the recess of the line and extending up onto the rim, evidence that the rim was once gilded.

The decorative techniques used on the bowl appear typical for Sasanian vessels. Details were chased using punches, and the borders of the figures were beveled by engraving. Gilding fills and obscures the recesses of the toolmarks; a ring, dot, and other punches were used. The granular features of the gilding where it lays in recesses indicate that it is amalgam gilding. In some places the gilding appears to have a layered structure, which may be due to



multiple applications of gilding and it does not seem that later regilding of the original has occurred.

The surface bears virtually no corrosion but is pitted and etched in many places. These features suggest that the bowl once bore a corrosion layer that was subsequently removed, perhaps by electrolytic cleaning. The outer surface shows evidence of wear in the form of numerous random scratches. A number of round depressions, which appear to be punch marks, are found along the edge of the rim above the heads of the figures. Wear and corrosion effects have obscured these marks, but they may possibly be the remains of an inscription.

The elemental composition of the bowl is unusual in that it contains a relatively large amount of zinc, which may indicate the use of brass scrap in the alloying of the silver.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 93.3 |
| Copper | 6.03 |
| Gold | 0.640 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.12 |
| Zinc | 21000 |
| Tin | 330 |
| Arsenic | n.m.* |

| | PARTS PER MILLION |
|---|---|
| Antimony | 3.14 |
| Selenium | 3.1 |
| Iron | 8.3 |
| Cobalt | 0.56 |
| Mercury | 0.064 |
| Chromium | 0.49 |
| Scandium | <0.0008 |

* Not measured.

## Notes

1. Harper 1988a, 338–42; a list of examples is given in her n20, to which the Sackler Gallery bowl can be added.

2. Harper 1988a, 341.

3. Harper 1988a, 340, with further references. A cross is also depicted on a Sasanian silver plate now in the Historical Museum, Moscow [see 16].

4. Moorey et al. 1981, 123, no. 712.

5. Gignoux 1975, 273, no. 7, figs. 14, 15.

6. This theme is discussed by Root 1979, 303–8, with further references.

7. A late Sasanian or post-Sasanian vase in the Hermitage Museum shows a standing male figure stabbing a rampant lion: Orbeli and Trever 1935, pl. 42. For sealstones, see Bivar 1969, 66, pl. 8, CG1/120311 (the seal preserves part of a Middle Persian inscription and is dated to the fourth century).

# 30

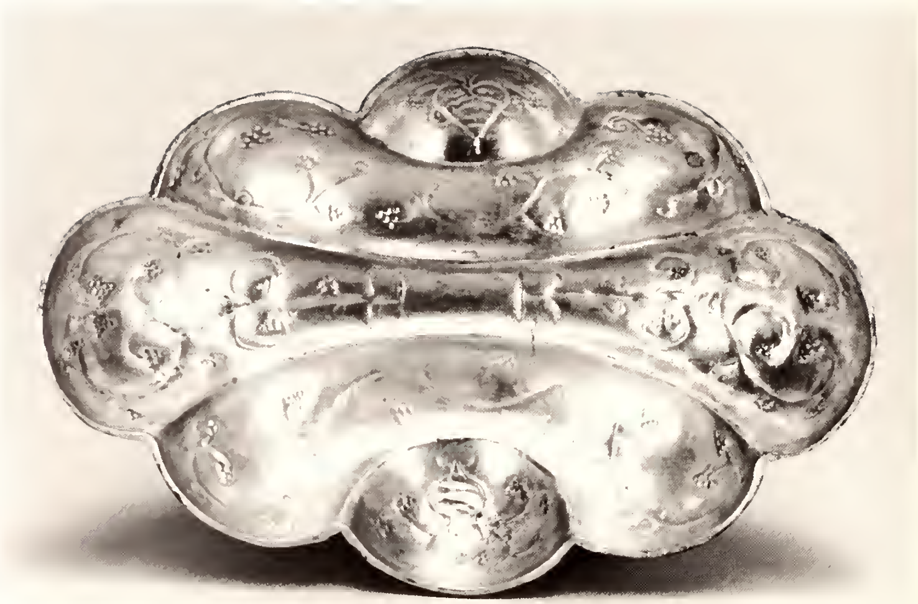
## *Lobed elliptical bowl*

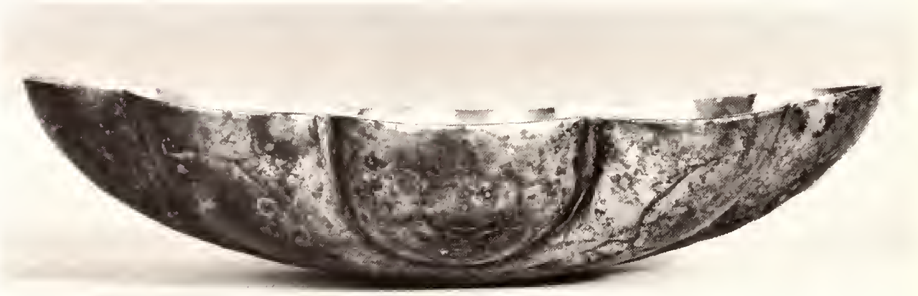
7th century A.D.
Silver and gilt: hammered, repoussé, gilded
Length 19.2 cm
Width 12.8 cm
Height 4.5 cm
Weight 203 g

Arthur M. Sackler Gallery, S1987.116
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*





A REPOUSSÉ PATTERN of vases and grapevines decorates the interior of this shallow bowl. Alternate interior lobes—the central and side lobes—are gilded.

A silver-gilt vessel of similar form, decorated on the interior with an incised fish, is in the Hermitage Museum, Saint Petersburg.[1] With its shallow, unimpressive execution, the Sackler bowl exemplifies a minor class of Sasanian silver vessels produced toward the end of the period, probably in the seventh century. The lobed elliptical form was, as in this case, usually decorated with animal or vegetal motifs or with human figures.[2]

### Technical Discussion

The vessel was formed by raising. The radiographic image shows that the metal walls vary in density in a manner suggesting hammer blows. The thickness of the walls appears more consistent than many hammered metal vessels, ranging between 1.0 and 1.5 millimeters, but there is a slight increase in thickness at the rim as is common with raised vessels.

The raised decorative pattern on the inner surface was formed by using punches and executed in repoussé. Two sizes of dot punches were used as well as an oval punch to create the lines. The decorative lines and divisions between the lobes are striated. This feature, combined with the radiographic appearance of these areas, suggests that tracing was used to raise the lines. Gilding was applied in three separate areas on the inner surface of the bowl. The gilding has all the visual attributes of amalgam gilding.

A variety of copper corrosion products is found on the surface, particularly on the outside of the vessel where about a third of the surface was left uncleaned. In this area are a number of fibrous and organic remains of unknown origin. The cleaned surface areas appear etched when viewed under magnification; this is probably due to the combined effects of corrosion and subsequent cleaning. A small oval loss, apparently filled in recent times, is present in the uncleaned areas.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 73.9 |
| Copper | 25.5 |
| Gold | 0.627 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.082 |
| Zinc | 2000 |
| Tin | 380 |
| Arsenic | 110 |
| Antimony | 19 |
| Selenium | 9.0 |
| Iron | 130 |
| Cobalt | 30 |
| Mercury | 0.69 |
| Chromium | <0.37 |
| Scandium | <0.014 |

## Notes

1. Orbeli and Trever 1935, pl. 57.

2. My thanks to Prudence Harper for information on this bowl.

# 31

## *Lobed elliptical bowl*

6th century A.D.
Silver and gilt: hammered, carved, chased, engraved, gilded
Length 24.5 cm
Width 10 cm
Height 5.8 cm
Weight 431 g

Arthur M. Sackler Gallery, S1987.137
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

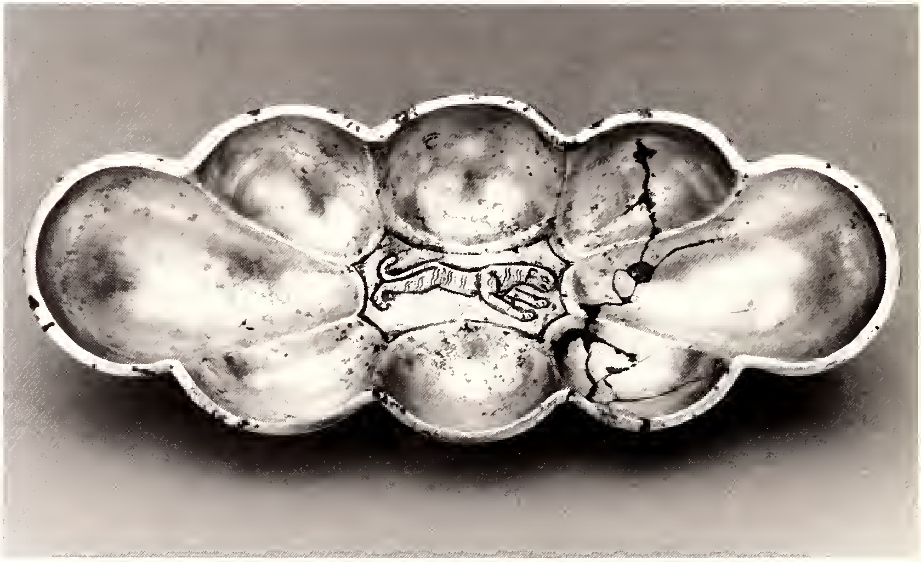
*Unpublished*

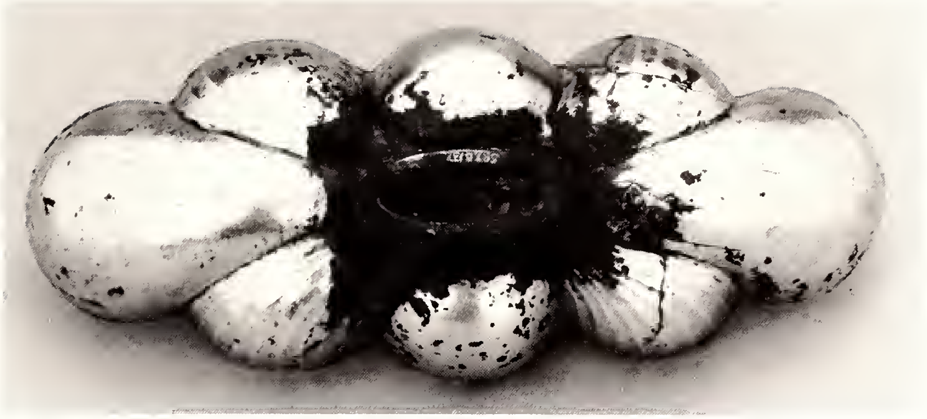
THE VESSEL SITS on an elongated ring foot. The walls of the vessel are thick, the rim is flattened; around the outer rim is an engraved line. On the exterior are four lobes on the short axes and four on the long axes; on the short axes, alternate lobes are vertically fluted.

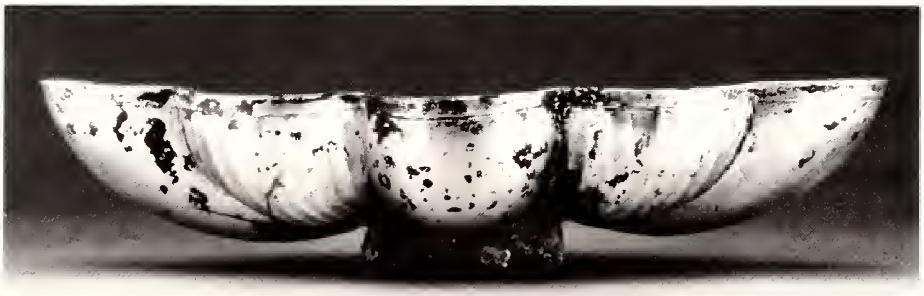
In the interior center is a tiger, in profile and running to the right, executed in repoussé. The fur is indicated by paired wavy lines, separated by punched dots. The background is gilded around the central design.

A close parallel for this bowl is a silver bowl now in the Abegg-Stiftung, Bern. In both examples the eight lobes of the vessel are treated as individual elements rather than a combination of three elongated lobes and two small lobes or bosses on the short axes [see 30]. The interior of the bowl in Bern is decorated with a running boar, inlaid in niello.[1] The tiger on the interior of the Sackler Gallery bowl closely resembles another example on the exterior of an elliptical bowl in the Museo Civico, Turin.[2] Tigers appear on other examples of the elliptical group of Sasanian silver vessels, including one in the Sackler Gallery [27]. Female tigers, their stripes inlaid in niello, decorate the exterior of an unusual boat-shaped vessel in the Norbert Schimmel collection.[3]

A close parallel for the particular form of the Sackler lobed bowl was found in a hoard excavated at Datong in northern China, believed to have been buried before the move of the Northern Wei capital to Luoyang in A.D. 493.[4] The bowl from Datong, also made of silver, has eight individually modeled lobes. The upper surface of its flattened rim is decorated with five-petaled forms that project between the lobes toward the interior. In the interior center is a curvilinear design in relief illustrating a makara (an aquatic creature of Indian mythology) together with decorative vegetal forms. The presence of the makara and the style of the design resemble decorative motifs in the art of Gupta India,







perhaps suggesting that the Datong bowl was made in India or Pakistan.[5]

The context of the Datong bowl suggests a date of perhaps the early sixth century for the Sackler bowl. Both the Abegg-Stiftung and Sackler Gallery vessels would then be early examples of the silver elliptical bowls with elongated joined lobes that are well known from Iran, Central Asia, and China in the seventh and eighth centuries.[6]

## Technical Discussion

The rim of the bowl is 3.8 millimeters thick; 1 to 2 centimeters down from the rim the wall thickness is half that of the rim. The thickness of the vessel's wall decreases further at the point of greatest curvature and becomes thicker again at the center, a typical feature for silver objects created by raising. The radiographic appearance also displays the variations in density indicating a hammered form. The separately formed, thick, heavy foot is attached by soldering.

The fluting on the outer surfaces of the alternating lobes and the central medallion depicting a tiger were created by carving. The tiger stands in relief and the background was cut away. Details on the feline and the border that surrounds it were made by chasing. Traces of gilding are found on the feline and in the surrounding border. X-ray fluorescence surface analysis of the gilding does not indicate the presence of mercury, and the gilding has a microscopic appearance more like leaf gilding than amalgam gilding. The use of a type of gilding other than amalgam gilding for a late Sasanian silver object would be anomalous, however. The line running below and parallel to the rim on the outer surface was incised.

Corrosion once covered the entire vessel but has been removed except at the foot, its surrounding area, and isolated spots on the inside surface. Besides the typical copper corrosion products—such as malachite (copper carbonate) and cuprite (copper oxide)—atacamite (copper chloride) was also found on the vessel. Cracks in the metal run through two of the lobes, and a filled loss, measuring about one centimeter in diameter, is present in one of the larger end lobes.

## Composition

As determined by neutron activation analysis:

| | Bowl | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 93.2 | 89.9 |
| Copper | 6.18 | 9.47 |
| Gold | 0.638 | 0.639 |
| | PARTS PER MILLION | |
| Iridium | 0.066 | 0.042 |
| Zinc | 17 | 21 |
| Tin | 95 | 290 |
| Arsenic | 1.3 | 7.8 |
| Antimony | 0.84 | 21 |
| Selenium | 0.60 | 2.8 |
| Iron | 9.8 | 89 |
| Cobalt | 0.064 | 0.46 |
| Mercury | 0.14 | 0.14 |
| Chromium | 0.61 | 4.8 |
| Scandium | <0.0011 | <0.0011 |

## Notes

1. *Trésors de l'Iran ancien* 1966, no. 77, cat. 681 (length 24.8 cm; weight 688 g; acc. no. 8.123.64). The bowl is also illustrated in Harper 1988b, pl. 1, fig. 1.

2. Harper 1988a, 334 n. 8, item f.

3. Harper 1988a, 341–42, pl. 11b, c.

4. *Cultural Relics Unearthed in China* 1972, pl. 149; *Wenwu* 1977, no. 9: 68–75; Shih Hsio-yen 1983, 69, pl. 6. The Datong bowl and its relation to Central Asian and Sasanian silver vessels are discussed in Harper 1988b, 157.

5. Rawson 1984, 116, discusses the makara on the Datong vessel and suggests a place of manufacture in northern India or Central Asia.

6. Gyllensvärd 1957, 57–58.

# 32

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## *Vase*

6th–7th century A.D.
Silver and gilt: hammered, chased, gilded
Height 17.7 cm
Max. diameter 9.7 cm
Rim diameter 5.7 cm
Weight 631 g

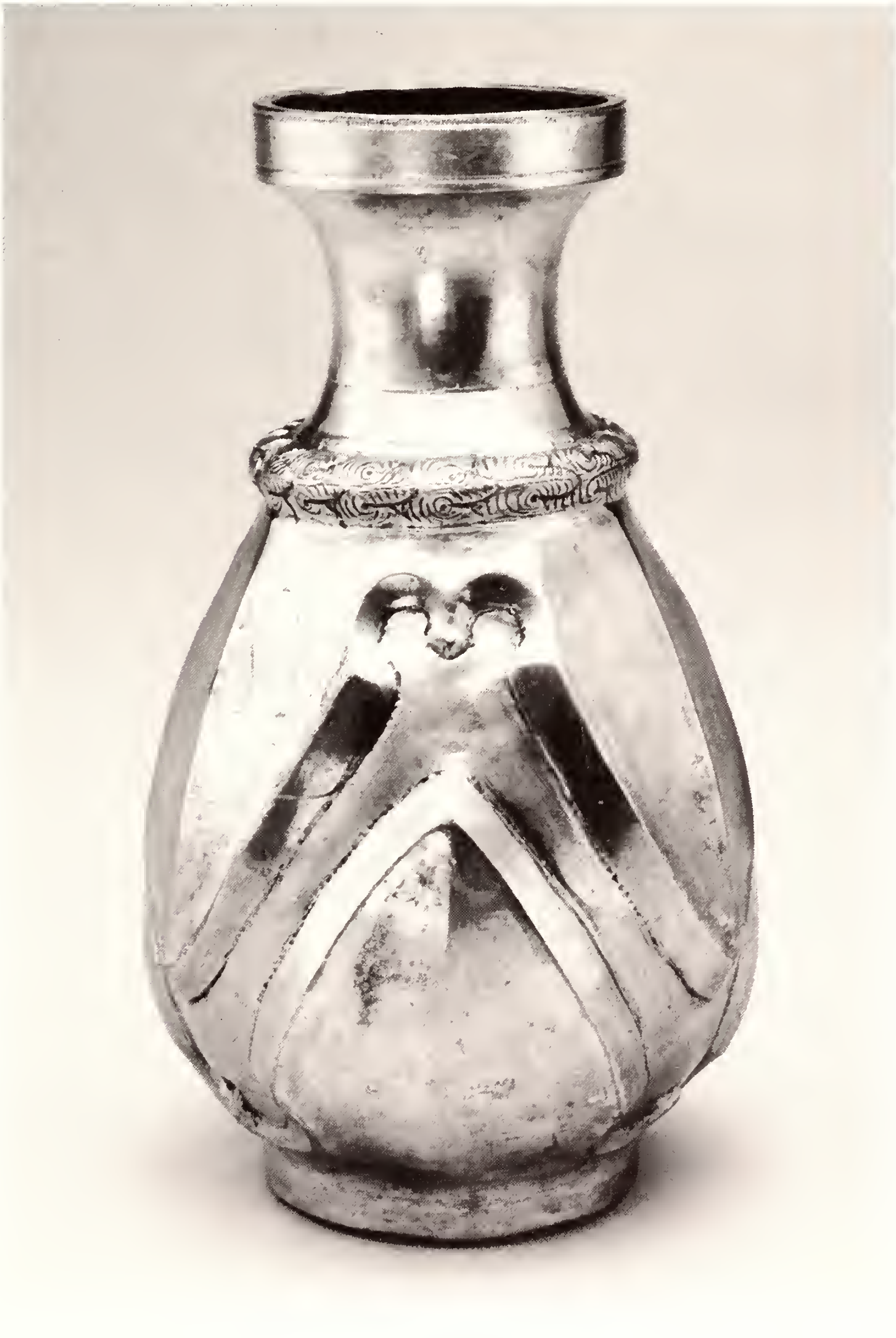
Freer Gallery of Art, 64.3
Purchased from K. Rabenou, 1964

*Exhibited:* Freer Gallery of Art, from 1964.

*Published:* Atıl 1971, no. 47.

THE VESSEL IS highly articulated, with offset rim, slightly flaring cylindrical neck, molding with leaf decoration separating neck and pear-shaped body, and flat circular base. Hammered and repoussé decoration on the body forms two rows each with three stylized leaves dovetailing with each other and separated by grooves. Rim, band above molding, leaf, and inset design on body are gilded.

An identical vase is in the Metropolitan Museum of Art, New York.[1] Gilded, trilobed decoration is found on Sasanian silver vessels of other shapes, but the



Freer and Metropolitan vases form a unique pair. The ornament on the molding is paralleled on a vase decorated with dancing female figures, now in the Hermitage Museum, Saint Petersburg.[2] Both shape and decoration, therefore, indicate a date late in the Sasanian era, in the sixth or seventh century.

Richard Ettinghausen observed in the decoration on this vase an "ambiguity between design and delimitations—further reinforced by the gilding of the beveled edges of the leaves."[3] Ettinghausen later cited this decoration in an article in which he suggested that the origins of the beveled style of early Islamic ornament, first attested at the Abbasid capital of Samarra (ninth century A.D.), lay in metalwork and seals of the Sasanian period.[4]

## Technical Discussion

This vase, like two others in the Freer collection [33, 34], was raised from a single sheet of metal. Design details, such as those on the leaf molding at the base of the neck and lower perimeters of the raised stylized leaves on the body, were made by chasing. The recessed lines encircling the rim and neck just above the leaf band appear to have been formed by a combination of chasing and tracing.

Amalgam gilding was used for the gilt surfaces but, unlike that seen on the other two vases, was not confined to the recessed areas of the surface. Here, the lip and raised band with the leaf motif were also gilded.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 95.6 |
| Copper | 3.78 |
| Gold | 0.663 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.058 |
| Zinc | 48 |
| Tin | <36 |
| Arsenic | 2.0 |
| Antimony | 0.62 |
| Selenium | 1.1 |
| Iron | 72 |
| Cobalt | 1.1 |
| Mercury | 3.3 |
| Chromium | 0.24 |
| Scandium | <0.0020 |

## Notes

1. Wilkinson 1962, 83. The vase is also illustrated in Harper 1979, 106, fig. 56.

2. Orbeli and Trever 1935, pl. 44; Marshak 1986, fig. 189.

3. Unpublished comments, 1964, Freer Gallery of Art registrar's object file (64.3).

4. Ettinghausen 1982, 31, citing the identical vase in the Metropolitan Museum of Art. Allen 1989, 230–39, with further references, discusses this and other theories on the origins of the beveled style.

# 33

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## *Vase*

6th–7th century A.D.
Silver and gilt: hammered, repoussé, chased, gilded
Height 17.9 cm
Max. diameter 10.5–11.0 cm
Rim diameter 5.9 cm
Weight 488 g

Freer Gallery of Art, 65.20
Purchased from Mr. and Mrs. Paul Mallon, Paris, 1965

*Exhibited:* Freer Gallery of Art, from 1966.

*Published:* Ettinghausen 1967–68, 29–41; Atil 1971, no. 50; Ettinghausen 1972, 3–4; Augé and Linant de Bellefonds 1986, 522, no. 90.

A HALF-ROUND MOLDING with imbricate design separates the pear-shaped body from the slightly flaring cylindrical neck. The base is flat; the rim, offset. The neck band above the molding and the surface of the body are gilded.

The body is decorated in repoussé with three figures moving to the right, each separated by a spirally fluted column topped by a bird standing on two acanthus leaves. A stylized mountain forms the column base.

The main figure is the god Dionysus, body rendered frontally with head in three-quarter view; he holds his attributes, a thyrsos in the right hand and a small panther on a short leash in his left hand. To the right, a maenad shown in profile holds two ears of wheat in her left hand and a small panther on a leash in her right; the animal drinks from a vessel. Her wavy hair is tied with a fillet ending in two short streamers; two long braids fall in back, with a shorter braid along the side of her face. She wears a long-sleeved, ankle-length tunic and over it, a knee-length wrap decorated with a ring-matted pattern. The third figure, a young draped male, plays with a child.

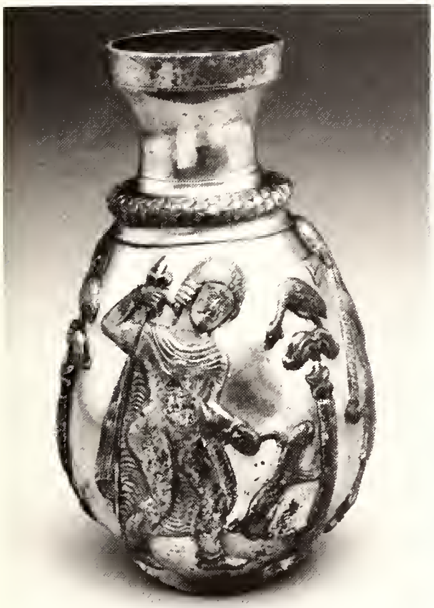
A large group of Sasanian silver-gilt vases illustrates Dionysiac themes and motifs, but only the Freer vase depicts the god himself [see also 16]. The theme of Dionysus and his cortège, or *thiasos,* is not common among surviving examples of late antique silver from the Near East. A silver-gilt vase in the Cleveland Museum of Art, said to be from Syria and dating to the fifth or early sixth century, depicts Dionysus and his followers.[1] Prototypes for the Sasanian representations of the god are found in Roman and Byzantine art of the third and fourth centuries.[2] Roman decorative arts also supplied the Sasanians with depictions of maenads.[3]

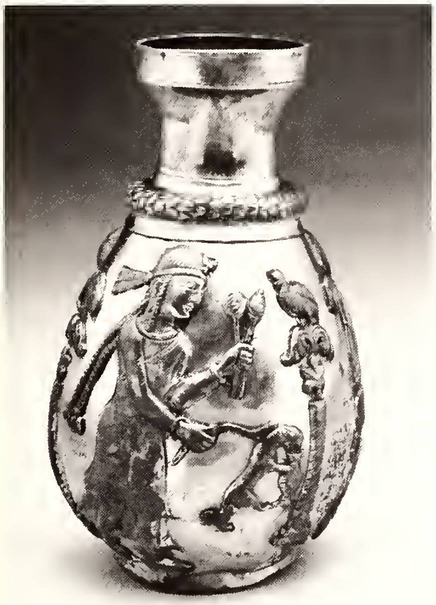
Parallels for other motifs, such as the maenad with a panther and a figure holding a child, occur on vases and ewers decorated with images of females holding fruit, birds, animals, children, and vessels; this group is illustrated by another vase in the Freer Gallery [34] and a ewer in the Sackler Gallery [36]. A column topped by a disk or sphere appears on the Cleveland Museum vase already mentioned.[4]

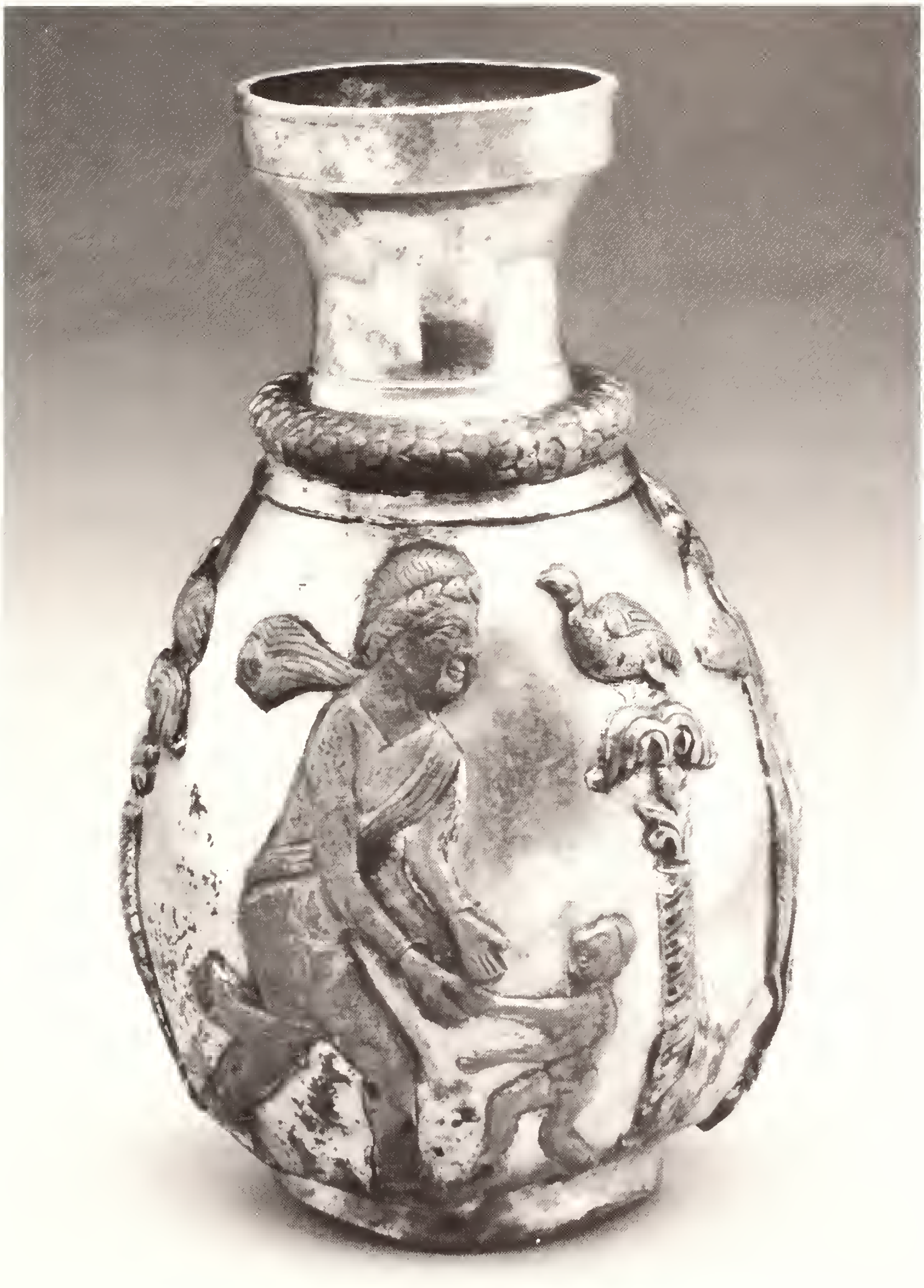
## Technical Discussion

After the raised decoration was formed using repoussé, the outline of the design was chased with a fine punch. The faces of the figures seen in profile were accentuated with a sharp outline by recessing the background down and under the edge of the features. The plain, recessed areas on the body appear to have been smoothed by burnishing prior to their polishing.

Figural details were made by chasing with several punches. Three recessed lines encircle the vessel at the top and bottom of the lip and at the bottom of the neck. The lines were formed by tracing. A ridge was made between the







raised band with an imbricated design and the heads of the figures.

Gilding was applied to the lip, neck, foot, and recessed background areas of the body; the raised design elements were left ungilded. No analysis was performed of the gilding, but its microscopic and visual features indicate that amalgam gilding was used.

The vase has become deformed at the foot and now stands slightly shorter and at an angle. Corrosion has caused pits and small holes to form in the metal and the loss of some surface detail.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 97.1 |
| Copper | 2.46 |
| Gold | 0.421 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.071 |
| Zinc | 17 |
| Tin | <30 |
| Arsenic | 0.46 |
| Antimony | 0.51 |
| Selenium | 1.3 |
| Iron | 7 |
| Cobalt | 0.047 |
| Mercury | 2.9 |
| Chromium | 0.35 |
| Scandium | 0.0027 |

## Notes

1. Weitzmann 1979, 153–54, no. 131.

2. Ettinghausen 1972, 3–4.

3. Harper 1971. Ettinghausen 1972, 9–10, discusses the motif of the panther drinking from a vase.

4. Compare the bird atop an altar (?) on a silver bowl with medallion decoration: Dalton 1964, 55–57, no. 202, pl. XXXII.

# 34

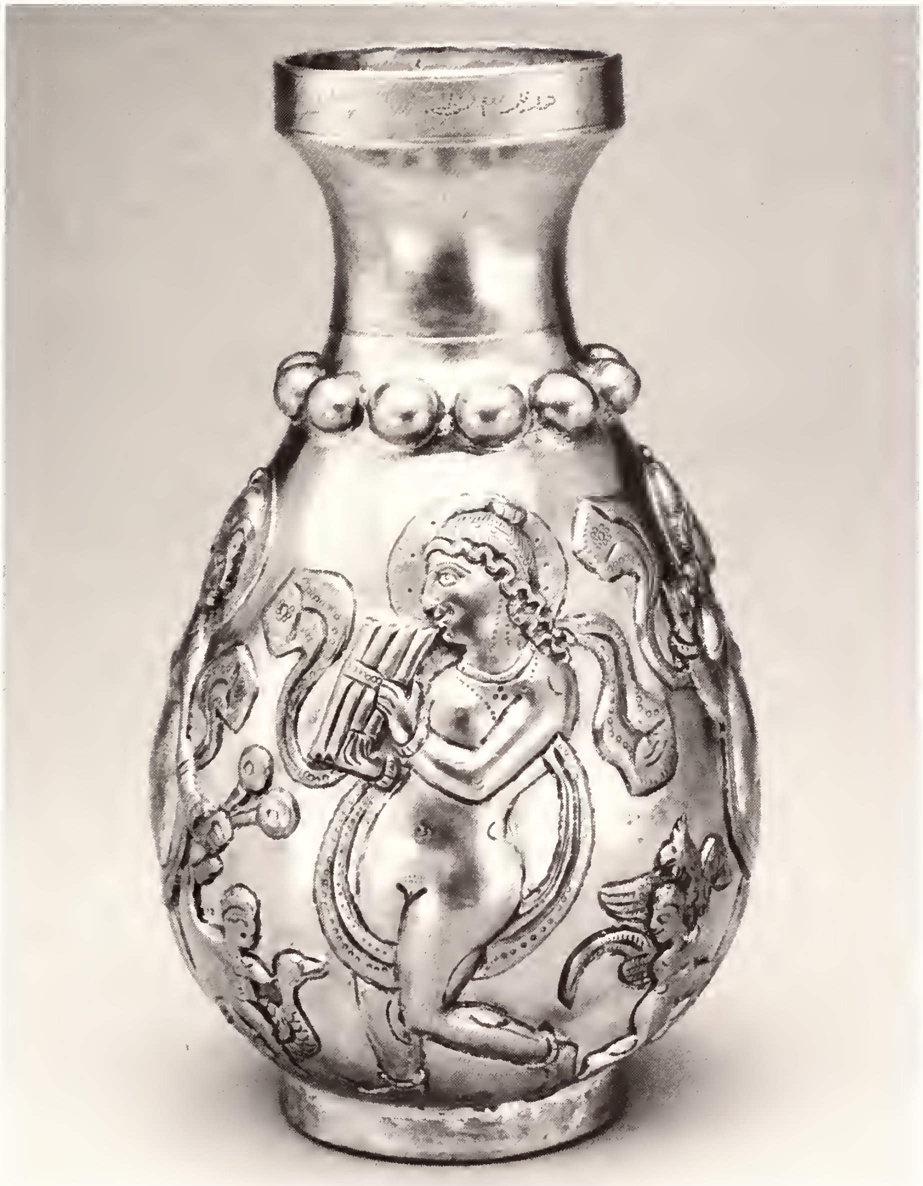
## *Vase*

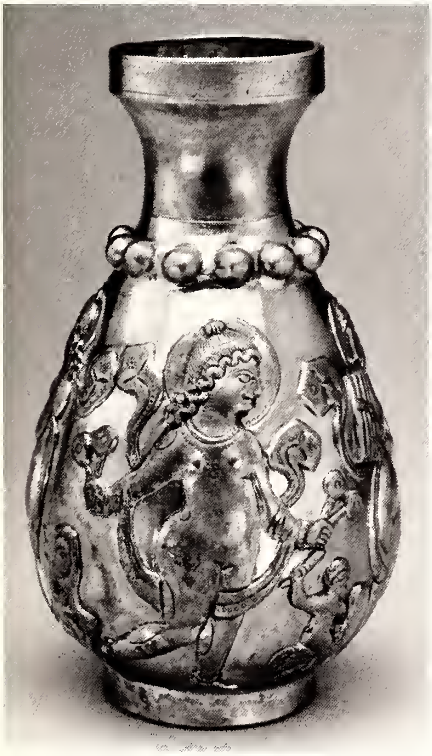
6th–7th century A.D.
Silver and gilt: hammered, repoussé, chased, gilded
Inscribed on rim
Height 19.3 cm
Max. diameter 10.6 cm
Rim diameter 6.1 cm
Weight 612 g

Freer Gallery of Art, 66.1
Purchased from Mr. and Mrs. Paul Mallon, Paris, 1966

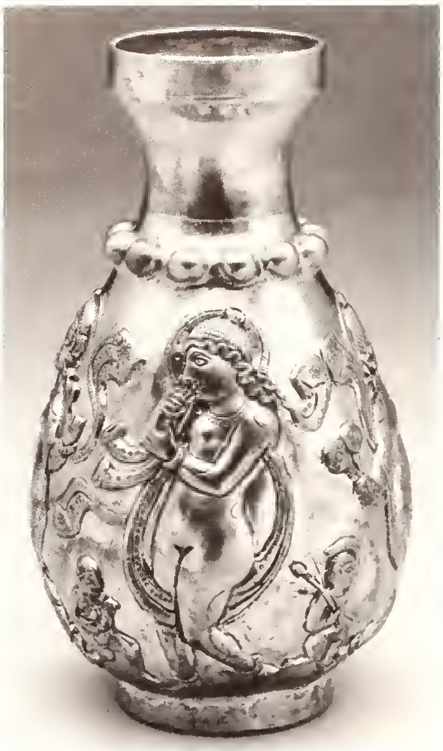
*Exhibited:* Freer Gallery of Art, from 1967.

*Published:* Ettinghausen 1967–68, 31–34; Atıl 1971, no. 49; Frye 1973, 10, no. 12; Brunner 1974, 114, no. 16; Gignoux 1984, 30–31, no. 20.





A BEADED MOLDING articulates the juncture between the pear-shaped body and the slightly flaring cylindrical neck. The base is flat and circular; the rim, offset. Four female figures with topknots and halos, executed in repoussé, decorate the body of the vase. A female playing panpipes faces left; opposite her, a female holds a pair of clappers in each hand. Between them is a child who holds a stick (?) and rides on the back of a bird. To the left of this pair is a female with a double horn; opposite her is another female, shown frontally, holding strands of her hair out to either side. Between them is a child with a bird. To the left of the frontal figure is a child, head turned away, holding a very large bird. To the left of the woman with clappers is a child who raises one arm over his head and holds a flower in his other arm.



A Middle Persian inscription on the vertical edge of the rim names the owner and gives the weight of the vessel: *[pn]'hwyh* 37 *[s]* 3 *[drahm]*, "Panāhveh, 37 *[stēr]* 3 *[drahm]*."[1]

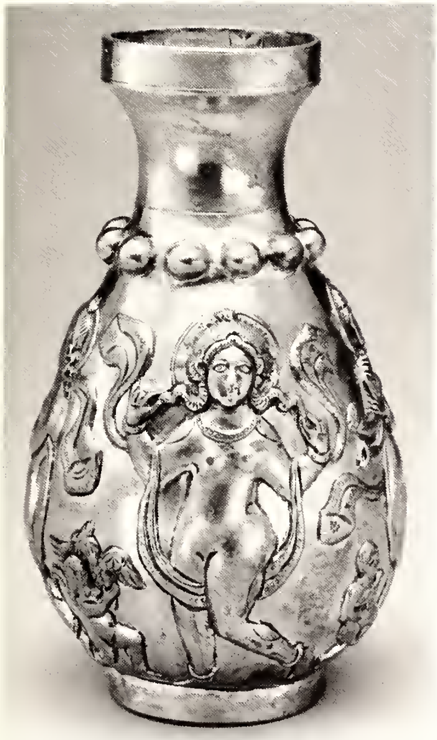
This vase is one of a group of Sasanian silver-gilt vessels decorated with figures of dancing females, often carrying or playing musical instruments.[2] Most such vessels are vases, but dancers occasionally are found on other vessel types. Dancing female musicians are also represented on a ewer in the Sackler Gallery collection [35]. Female dancers appear occasionally on other vessel types, as on the exterior of a lobed elliptical bowl with low ring foot in the Cleveland Museum of Art.[3] A nude dancer holding a scarf is depicted on the interior of a silver-gilt plate in the same museum.[4]

The presence of children and birds on the Freer vase combines elements of a related but distinct group of vessels bearing representations of female figures, often with halos and elaborate hairstyles, who hold fruit, birds, vessels, animals, and children; often the figures are placed within architectural frames. A ewer in the Sackler Gallery provides an example of this type [36]. The female figures of this group are modeled after Roman depictions of the Seasons and the Months, although they may also have had a specific meaning within an Iranian cultural setting [see 36].[5] The presence of halos and the elaborate hairstyles with topknots distinguish the individuals as royal or divine figures.

## Technical Discussion

A crack that developed where the foot meets the body gives the impression that the two were originally separate pieces joined together. Radiographs of the vase, however, reveal that the metal is continuous across the point where the foot and body meet, and no change in density nor the presence of solder is seen.

Figural details were chased. The basic punches used were a ring punch, dome punch, and punch with apostrophe-shaped face. Three recessed lines encircle the vessel at the top and bottom of the lip and at the bottom of the neck. The lines were formed by a combination of chasing and tracing. Punch marks on the lowest line may have served as guides for the additional toolwork used in forming the lines. The inscription on the neck was also formed by chasing. Gilding was applied to the recessed background areas of the body. No analysis was performed of the gilding, but its microscopic and visual features indicate the use of amalgam gilding.



## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 94.7 |
| Copper | 4.56 |
| Gold | 0.701 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.15 |
| Zinc | 26 |
| Tin | <25 |
| Arsenic | 3.0 |
| Antimony | 0.97 |
| Selenium | 2.7 |
| Iron | 18 |
| Cobalt | 0.73 |
| Mercury | 0.76 |
| Chromium | 1.1 |
| Scandium | 0.0035 |

## Notes

1. The reading here is that proposed by Gignoux 1984, 30–31, no. 20 (alternative readings have been proposed by Frye 1973, 10, no. 12; and Brunner 1974, 114, no. 16). For the proper name Panāh-veh, see Gignoux 1986, 145, no. 746.

2. Ettinghausen 1967–68; Ettinghausen 1972, 4–10; both with further references.

3. Ettinghausen 1967–68, 33, fig. 10.

4. Ettinghausen 1967–68, 32, fig. 7.

5. Harper 1971. For the Roman Horae, see now Casal 1990, with pls. 349–54.

# 35

## Ewer

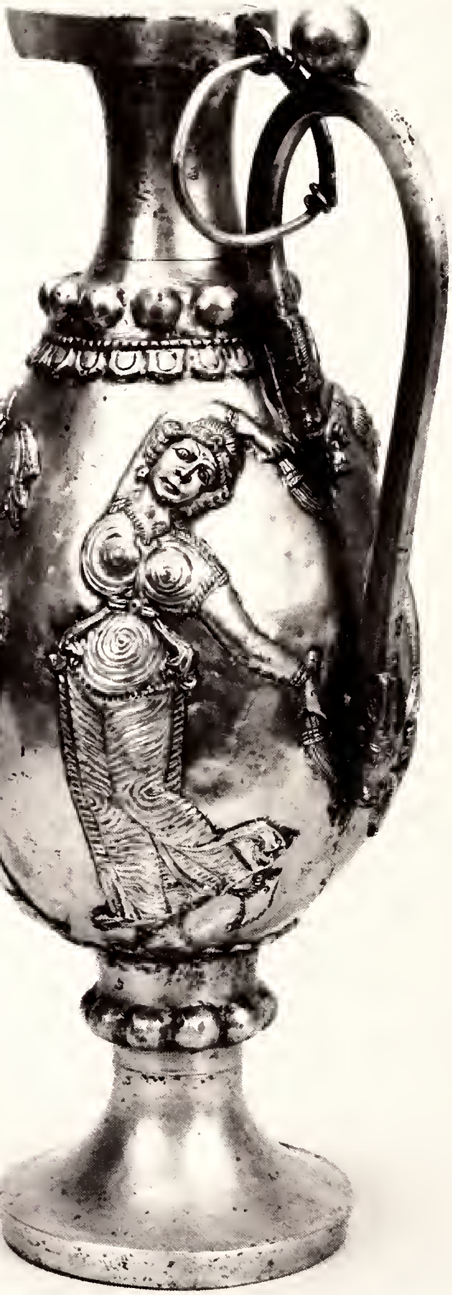
6th–7th century A.D.
Silver and gilt: hammered, repoussé, chased, gilded
Inscribed on foot
Height 34 cm
Max. diameter 13 cm
Weight 1,394 g

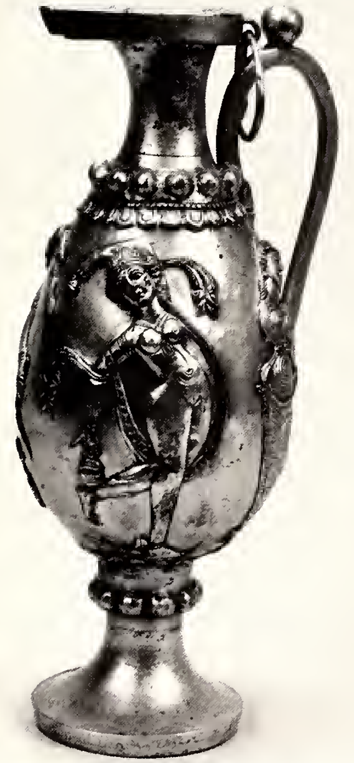
Arthur M. Sackler Gallery, S1987.117
Gift of Arthur M. Sackler, 1982

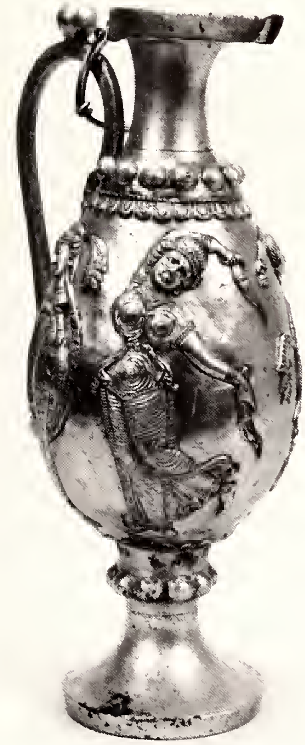
*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Lawton et al. 1987, 52, no. 23a; Gunter 1988, 6, 48.

BEADED MOLDINGS separate the pear-shaped body from the cylindrical neck, and the body from the tall foot. The handle, topped by a round ball, is attached at the upper part of the body and at the widest part of the body; it terminates at both ends in the head of an onager. The handle reaches to the top of the vessel, and the ball atop the handle rises to the level of the spout. The spout is equipped with a fitted lid.







A scale pattern frames the body, above and below. The lid, ball on the handle, ends of the handle, surface of the body, and band above and below the beaded moldings are gilded. Across the outer edge of the foot is a dotted inscription.

The body is decorated with two identical pairs of dancing female figures: two figures wearing a transparent costume and holding castanets alternate with heavily draped figures holding torches. The hairstyle of all four figures consists of hair combed forward from the crown, held in place with a hairband or tiara, with a row of four waves on either side of the head.

To the left of the handle is a draped figure in three-quarter, nearly frontal view, in high relief. She moves to the left, with her arms, bearing torches, trailing to the right. Her left foot is in the air. She wears a short-sleeved garment with hatched bands at the neck and sleeve ends; highly patterned folds form concentric circles around her belly and each breast. A belt with ribbons falling to each side of her hips encircles her tightly cinched waist. Her garment is stretched across the legs in a complex pattern resembling horizontal fluting and forming concentric circles at the knees.

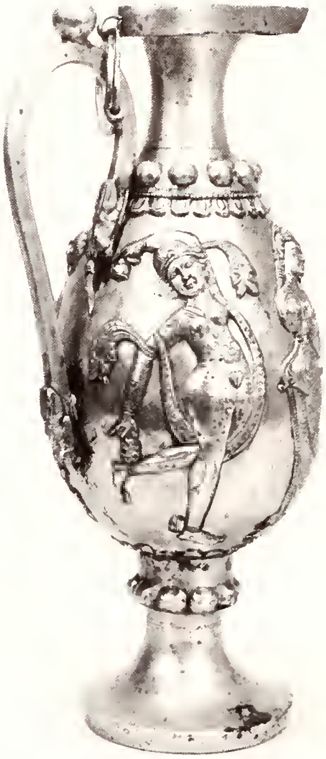
A second type of figure, also repeated, stands opposite the one just described; her body faces her draped partner. She is nude, with nipples, navel, and pubic triangle indicated, and she is heavily adorned with jewelry: necklace, armbands, bracelets, and earrings. A scarf draped around the back of the figure and over each elbow flies out to either side in patterned ends; the cloth is decorated with a ring-matted design. She holds castanets in each hand, and a third castanet is attached to the ankle of her weight-bearing leg.

The surface of the lid is gilded and bears an incised figure of a nude female holding torches, in a posture similar to that of the figures on the body of the ewer.

A Middle Persian inscription on the outer edge of the foot reads: *hwslwb Y b'pk'*, "Khusro, son of Bābak," followed by the weight of the vessel.[1]

The dancing females on this ewer are figural types also found on a number of Sasanian silver vases.[2] A vase decorated with nude female dancers holding musical instruments, closely related in composition and style to the Sackler ewer, is in the Freer Gallery [34]. Unlike the dancers on the Freer vase, however, those on the Sackler ewer lack the halos and elaborate hairstyle including the topknot that distinguish figures as royal or divine.

The dancing figures on the Sackler ewer and on the Freer vase are related to the female figures depicted on a number of Sasanian silver vessels, principally on vases and ewers. They hold fruit, animals, vessels, and other attributes, as illustrated on a second Sackler ewer with figural decoration [36], but are distinguished by their hairstyle and costume and may therefore require a somewhat different interpretation. Like the figures with elaborate headdress on the second



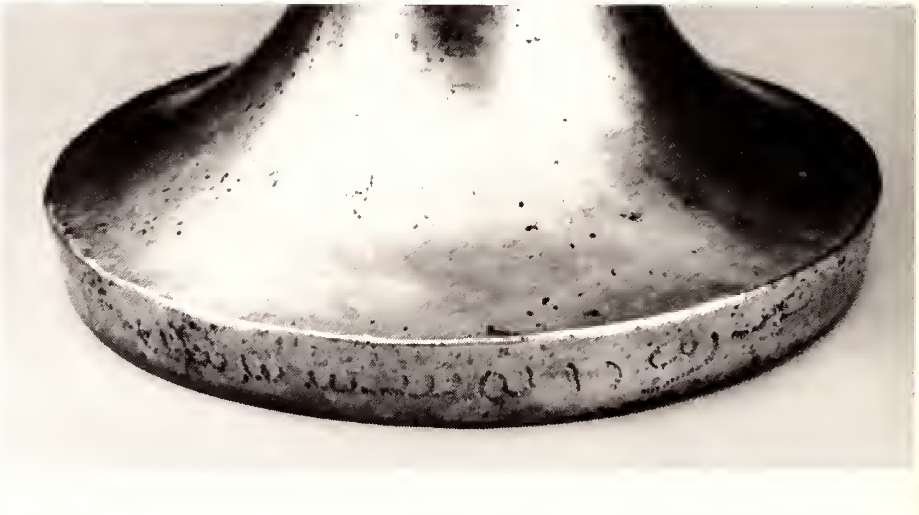
Sackler ewer [36], female figures holding torches and musical instruments have been given both religious and secular interpretations. Guitty Azarpay has interpreted related scenes of figures holding musical instruments as illustrations of the *den*, the soul's accomplishments in the material world; according to Zoroastrian texts, the *den* is a concept personified as a "beautiful female form."[3]

## Technical Discussion

The construction of this ewer is essentially the same as the other two Sasanian ewers in the Sackler Gallery collection [36, 37]. A single piece of metal was used to form the spout, neck, and body. The foot, handle, and thumb rest were made separately, with the thumb rest soldered to the top of the handle and the handle and foot then soldered to the body. The lid is separate as well and was formed from one piece of metal. Two wire loops attach the lid to the handle; this arrangement appears original but may be a later addition or comprise later repairs. All the various parts, with the possible exception of the handle, have a radiographic appearance indicating that they were formed by hammering.

The metal at the base of the body, just above the juncture with the foot, is extremely thin. When the ewer was first obtained by the Sackler Gallery, the bottom was bent and distorted, with the foot having been compressed into the body. Tears and slight losses were also apparent. The body was reshaped in the area of damage. The thinness of the metal on vases of similar construction and design [such as 32, 33] and the common presence of damage in this area have been noted by Richard Ettinghausen.[4]

Design details were chased. The figure on the lid appears to have been created by a combination of chasing and engraving. Amalgam gilding, identified through metallographic examination, was applied to the background areas of the body.



## Composition

As determined by neutron activation analysis:

| | Spout | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 95.4 | 70.4 |
| Copper | 3.81 | 29.1 |
| Gold | 0.815 | 0.464 |
| | PARTS PER MILLION | |
| Iridium | 0.048 | 0.12 |
| Zinc | 33 | 17000 |
| Tin | 11 | 610 |
| Arsenic | 0.43 | 130 |
| Antimony | 0.49 | 36 |
| Selenium | 1.4 | 79 |
| Iron | 4.3 | 63 |
| Cobalt | 0.28 | 0.79 |
| Mercury | 0.060 | 1.7 |
| Chromium | 0.20 | <0.074 |
| Scandium | 0.0027 | <0.026 |

### Notes

1. Philippe Gignoux kindly provided a reading and translation of this inscription based on a photograph. A silver-gilt ewer of similar form in the Metropolitan Museum of Art also preserves an inscription on the foot naming the owner: Brunner 1974, 117–18, no. 32, fig. 6.

2. Ettinghausen 1967–68, 28–41.

3. Azarpay 1976.

4. Ettinghausen 1967–68, 34.

# 36

## *Ewer*

6th–7th century A.D.
Silver and gilt: hammered, repoussé, chased, gilded
Height 32.5 cm
Max. diameter 15.2 cm
Weight 1,167 g

Arthur M. Sackler Gallery, S1987.118
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Lawton et al. 1987, 52, no. 23b; Gunter 1988, 6, 48.

THE VESSEL IS highly articulated, with a cylindrical neck, pear-shaped body, and tall foot. A torus molding ornamented with a grape-and-leaf design separates neck from body and body from foot. The handle, topped by a ball, is attached at the widest part of the body and near the neck; both ends of the handle terminate in an onager's head. The base is a ring, the walls of which angle toward the vessel. The fitted lid of the spout is undecorated. The surface is gilded from the base of the neck to the top of the foot.

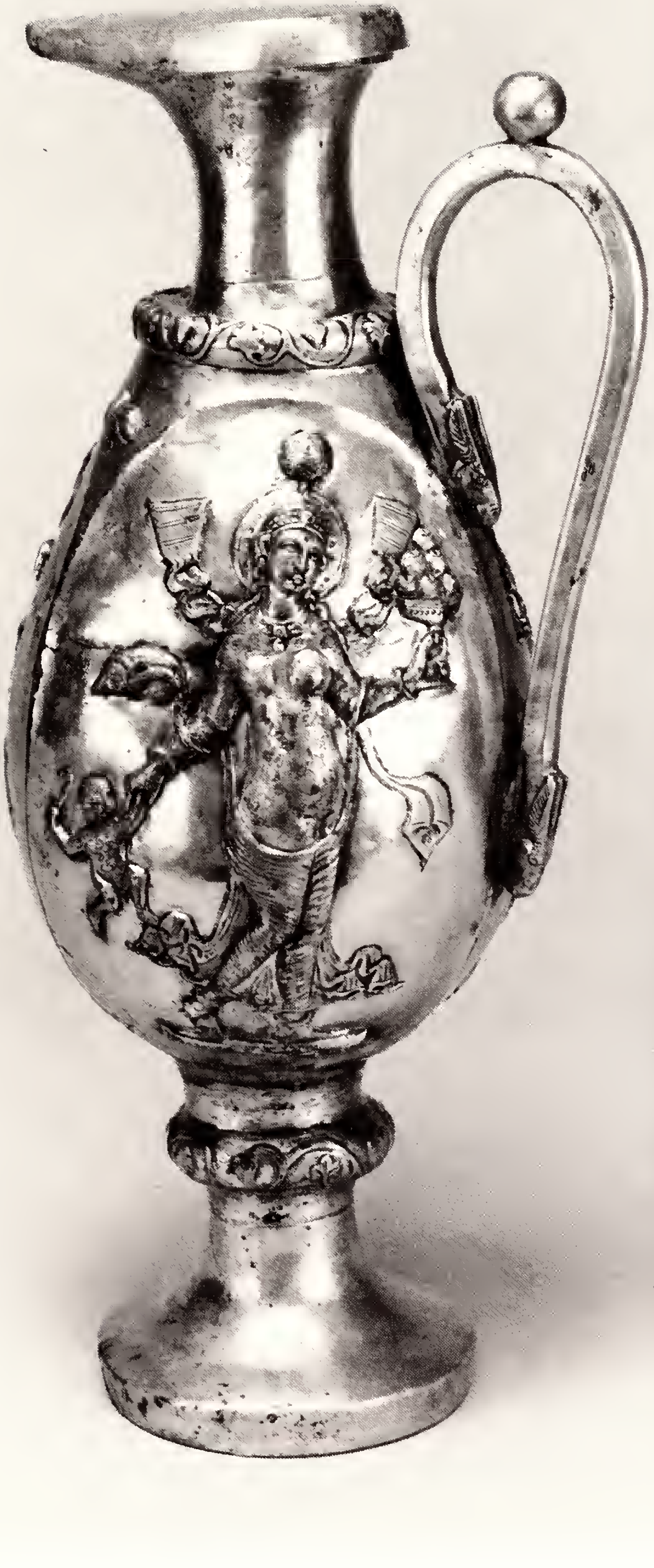
On the body of the vessel are three female figures, each holding a pair of attributes: flower and bird, peacock and pyxis, and child and bowl of fruit. Presented in three-quarter view, each figure stands on a short, isolated ground line. They have halos and topknots and are dressed similarly in a tight-fitting, long-sleeved garment decorated with a ring-punched pattern. A scarf or shawl is draped around the figure in front, at the upper thigh; the ends are wrapped around the forearms and fall in thick folds around the legs. The figures are adorned with a tiaralike headband with a central circular ornament, necklace, and earrings.

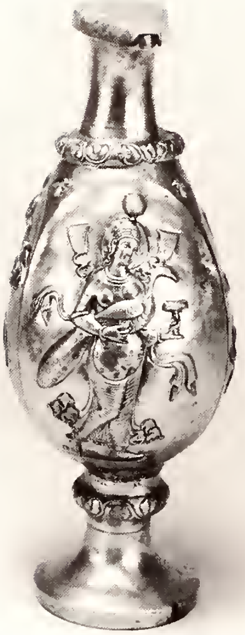
To the left of the handle is a figure of a half-draped female with streamers from either shoulder. In her left hand she holds a footed bowl containing fruit. With her right hand she grasps the arm of a child who faces away from her and carries in his other hand a cane (?). The figure in the center carries a pyxis in her left hand and against her body a peacock. Her shawl falls to the ankles in a fluted pattern and off to the sides in a mannered fashion. The two ends of the scarf form stylized points.

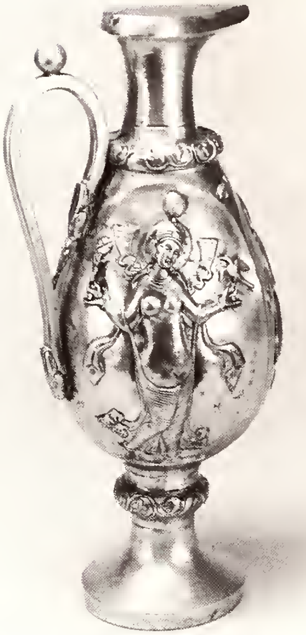
The third figure holds a bird in her right hand and a flower in her left hand. In addition to her necklace and earrings, a three-lobed pendant hangs from her necklace.

A close parallel for the form and decoration of this ewer is in the Metropolitan Museum of Art, New York.[1] Both ewers belong to a group of silver-gilt vessels decorated in repoussé technique with female figures holding flowers, vessels, animals, or children. Usually four or six figures are on a vase, each standing within an architectural frame. With its three figures, the Sackler Gallery ewer is unusual.

The repertory of attributes is highly consistent among this group of vessels. Most objects or creatures held by the figures on the Sackler ewer can be paralleled among the other examples in the group. The footed bowl, here shown filled with fruit, is depicted on a silver plate in the Bibliothèque Nationale, Paris, and on a small hemispherical bowl in the Sackler Gallery [25]. The pyxis is represented on vases in the Hermitage Museum, Saint Petersburg, and on a ewer very similar to the Sackler ewer in the Metropolitan Museum of Art.[2] The four-heart rosette flower is also seen on a vase in the Hermitage.[3] Only the peacock is unusual. Birds are common attributes among the vessels of







this group, but most are smaller varieties, held in one hand.[4]

A closely related group of vessels depicts female figures with halos and topknots, holding the same attributes but lacking the arcades framing the figures. Particularly close to the figures on the Sackler Gallery ewer are those on a silver vase and a silver-gilt vase-rhyton in the Cleveland Museum of Art, one depicting a figure carrying a bird and a child and another with a female figure holding a bowl of fruit.[5] Silver-gilt vases depicting female figures with halos who hold birds, fruit, and flowers are found in several other museum collections.[6]

The identification and meaning of the female figures on the vessels have been extensively discussed. One principal theory interprets the female figures as images of the goddess Anahita, a pre-Zoroastrian Iranian deity of abundance and fertility, or of her priestesses. The architectural setting of the figures on this group of vases has suggested to some scholars that a templelike enclosure is represented. Similar female figures, sometimes placed in a kind of architectural frame, are found on Sasanian sealstones beginning in the fourth century.[7] A related interpretation also links the figures to fertility cults but suggests that the repertory of Dionysiac imagery served as the primary source for the Sasanian figures.[8]

An alternative theory appreciates the figures as inspired by Roman depictions of personifications of the Seasons and the Months.[9] The vessels depicting them may have been made for and used on the occasion of court celebrations of seasonal festivals.[10] Third-century mosaics from the palace of Shapur I (r. A.D. 241–72) at Bishapur in southwestern Iran demonstrate that Roman scenes of this type were made within Iran itself.[11]

The figures on the Sackler Gallery ewer stand on separate ground lines, a device found on other Sasanian silver vessels depicting female figures.[12]

## Technical Discussion

With a few exceptions, this ewer is essentially the same in construction and decoration techniques as the ewer just discussed [35]. The lid is undecorated, and there is no clear evidence that it was attached to the handle by wire loops as with the other ewer [35], although solder is found on the back of the lid where a ring may have been attached. Also, the radiographic density of the two ewers differs slightly, with this ewer appearing somewhat denser. Given the similarity of the alloys used in the two objects, the metal of this ewer must be somewhat thicker. The difference, however, is not significant.

## Composition

As determined by neutron activation analysis:

| | Spout | Foot |
|---|---|---|
| | PERCENT | |
| Silver | 96.6 | 62.1 |
| Copper | 2.61 | 37.4 |
| Gold | 0.751 | 0.446 |
| | PARTS PER MILLION | |
| Iridium | 0.25 | 7.3 |
| Zinc | 13 | 360 |
| Tin | <16 | 340 |
| Arsenic | 0.28 | 130 |
| Antimony | 0.15 | 14 |
| Selenium | 1.7 | 28 |
| Iron | <3.8 | <24 |
| Cobalt | 0.039 | 0.88 |
| Mercury | 1.0 | <0.038 |
| Chromium | 0.54 | 17 |
| Scandium | 0.0012 | 0.0064 |

## Notes

1. Harper 1978, 60–61, no. 18.

2. Harper 1971, pl. II, figs. 1, 2.

3. Orbeli and Trever 1935, pls. 46, 47.

4. Harper 1971, fig. 1. For a peacock on a vase, see Bothmer 1990, 60–61, no. 44.

5. Grabar 1967, no. 19; Shepherd 1964, 81 left (vase-rhyton).

6. Virginia Museum of Fine Arts: Ettinghausen 1967–68, 28–29, figs. 1–4; Hermitage: Orbeli and Trever 1935, pls. 44–47; Walters Art Gallery (acc. no. 57.1923). Two examples are in the Shelby White and Leon Levy collection: Bothmer 1990, 60–62, nos. 44, 45.

7. Harper 1978, 145–46, with further references.

8. Ettinghausen 1972, 3–10, with references.

9. Harper 1971. On the Roman Horae, see now Casal 1990, with pls. 349–54.

10. Carter 1974, 198–202, with additional bibliography.

11. Ghirshman 1956, 37–77, 111–41, pls. A, B, V–XIV; also noted in Ettinghausen 1972, 5, 8.

12. For example, a silver-gilt plate in the Cleveland Museum of Art: Ettinghausen 1967–68, 32, fig. 7.

# 37

## *Ewer*

6th–7th century A.D.
Silver and gilt: hammered, repoussé, chased, gilded
Height 35.6 cm
Width 15.5 cm
Max. diameter 11.3 cm
Weight 1,039 g

Arthur M. Sackler Gallery, S1987.140
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*

A BEADED MOLDING separates the cylindrical neck from the elongated pear-shaped, fluted body, and the body from the foot. A gilded band frames the beaded molding at the neck and foot. The handle is attached at the maximum diameter of the ewer and just below the neck; it rises to about the midpoint of the neck and is topped by a ball. Both ends of the handle terminate in the head of a bird, probably a duck. The moldings and handle ornaments are gilded. The lid is missing.

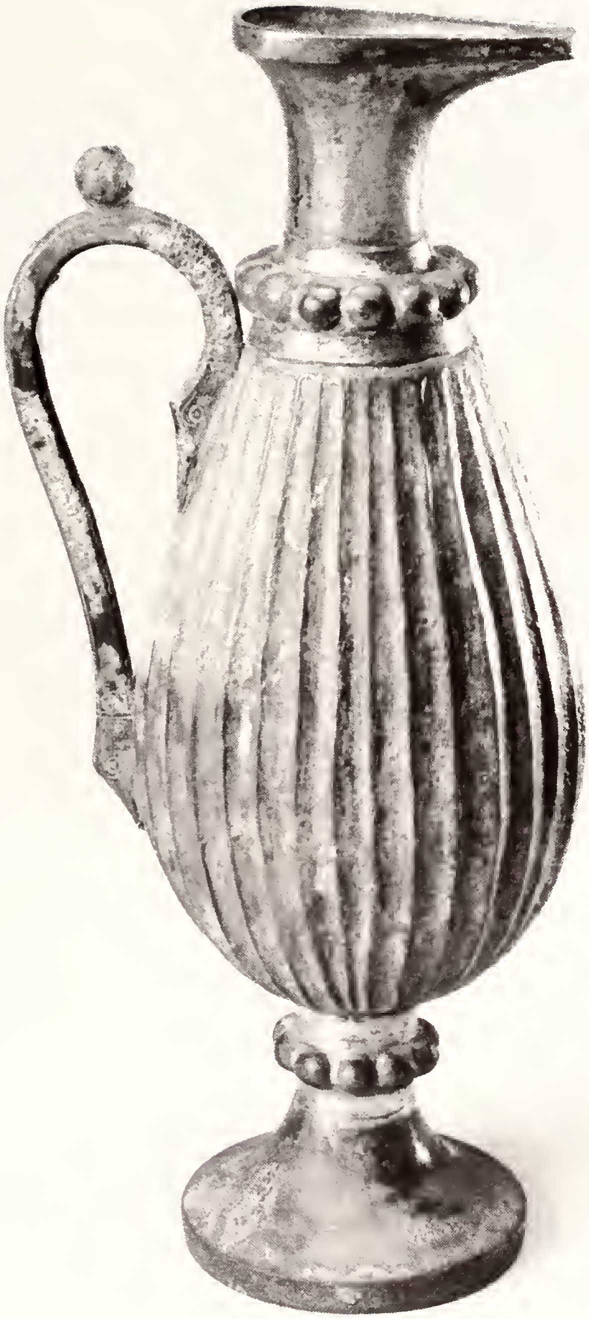
In its form, proportions, moldings, and handle ornament, this ewer resembles the group of silver-gilt ewers with figural decoration [see 35, 36]. Examples with a fluted body are uncommon. A ewer without figural decoration, but with curved vertical fluting, is depicted in the investiture relief at Taq-i Bustan, generally dated to the reign of the Sasanian king Khusro II (r. 591–628).[1] A silver ewer entirely decorated with horizontal fluting is in the Cleveland Museum of Art.[2] The Sasanian ewer with a vertically fluted body was closely reproduced, primarily in bronze, in the early Islamic period.[3]

An identical ewer is in the collection of Noriyoshi Horiuchi.[4] Like other vessels in the Freer and Sackler Gallery collections, such as the Freer silver-gilt vase [32], this ewer was one of an identical pair or group of vessels probably intended for a luxury table service.

## Technical Discussion

Consideration of the technical features of the ewer is hindered by the extensive damage and restoration that the vessel has undergone. The central section of the body was broken into many pieces and was reconstructed prior to its acquisition by the museum. Although the reconstruction appears faithful to the original shape of the body, radiographic images illustrate a number of small areas of loss that have been filled in and painted over. None of the losses is greater than one to two centimeters in length. Another confusing feature is that the spout and neck form a separate piece that has been attached to the body where the vertical fluting begins. It appears, however, that the join is a repair and that the body, neck, and spout were formed originally from a single piece of metal as is the case with the other two ewers described previously [35, 36]. The handle and foot were also reattached during the restoration.

The surface areas not covered by overpaint appear ancient. Extensive copper corrosion, with textile impressions, is present on the handle and foot. The spout and neck also bear convincing evidence of age in their wear and extensive corrosion. Compositional analysis shows the handle, spout, and foot to be made of alloys typical to those seen in other works of Sasanian silver. One difference between this ewer and the two discussed earlier, however, is the similarity between the alloys used for the body and the foot. The other two ewers



have feet formed from an alloy with a greater copper content than that of the bodies. Decorative details are difficult to see. Those found on the handle appear to be chased. The gilded bands framing the two rows of bosses on the neck and foot have the microscopic appearance of amalgam gilding.

## Composition

As determined by neutron activation analysis:

| | Spout | Foot | Handle |
|---|---|---|---|
| | PERCENT | | |
| Silver | 96.6 | 94.7 | 93.1 |
| Copper | 2.77 | 4.47 | 6.22 |
| Gold | 0.675 | 0.839 | 0.718 |
| | PARTS PER MILLION | | |
| Iridium | 0.016 | 0.15 | 0.049 |
| Zinc | 26 | 12 | 1100 |
| Tin | 17 | <42 | 690 |
| Arsenic | 0.39 | 0.75 | 21 |
| Antimony | 0.18 | 0.32 | 15 |
| Selenium | 0.46 | 1.9 | 2.1 |
| Iron | <6.4 | 29 | 36 |
| Cobalt | 0.026 | 0.18 | 0.60 |
| Mercury | 0.040 | 0.096 | 0.22 |
| Chromium | 0.19 | 2.8 | 2.4 |
| Scandium | <0.0012 | <0.0014 | <0.0017 |

## Notes

1. Fukai and Horiuchi 1972, pls. XXXI, XXXII.

2. Grabar 1967, 129, no. 44.

3. *Seven Thousand Years of Iranian Art* 1964, 33, no. 529, illustrated, 157 (bronze fluted ewer, eighth–ninth century).

4. Horiuchi 1989, no. 39 (height 36 cm).

# 38

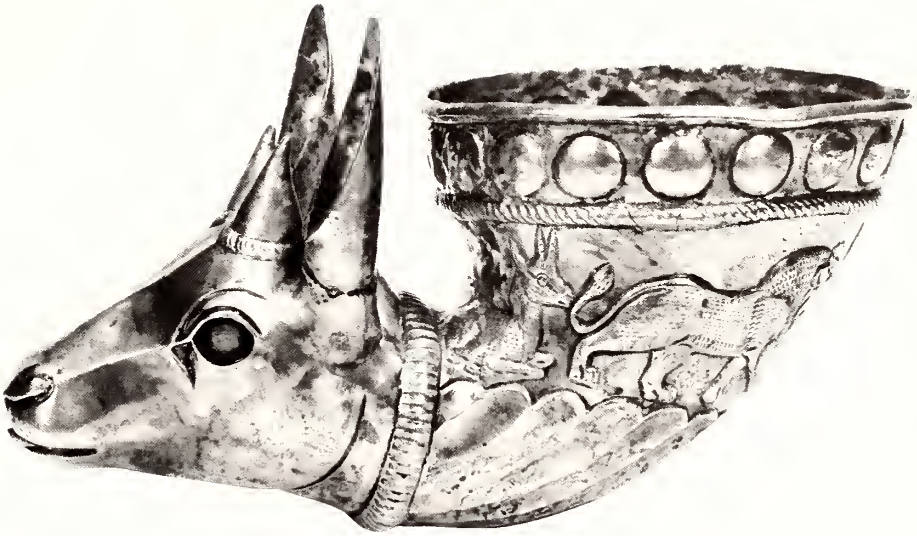
## *Horn rhyton*

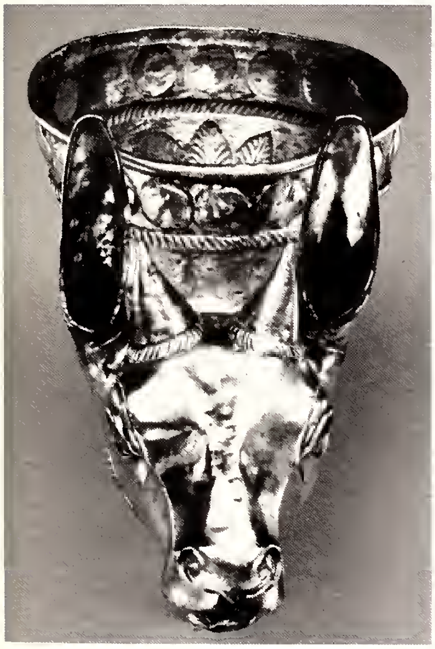
4th century A.D.
Silver and gilt: repoussé, chased, punched, gilded
Length 25.4 cm
Height 15.5 cm
Width 14.1 cm
Rim diameter 14.0 cm
Weight 599 g

Arthur M. Sackler Gallery, S1987.33
Gift of Arthur M. Sackler, 1982

*Exhibited:* Asia Society Gallery, New York, 1978; Royal Scottish Museum, Edinburgh, 1984; Arthur M. Sackler Gallery, from 1987.

*Published:* Shepherd 1966, fig. 11; Harper 1978, 36–38, no. 5; Gunter 1987, 43–44, fig. 10; Lawton et al. 1987, 48, no. 20; Gunter 1988, 47, fig. 28; Harper 1988b, 157–58, pl. 1, fig. 2.





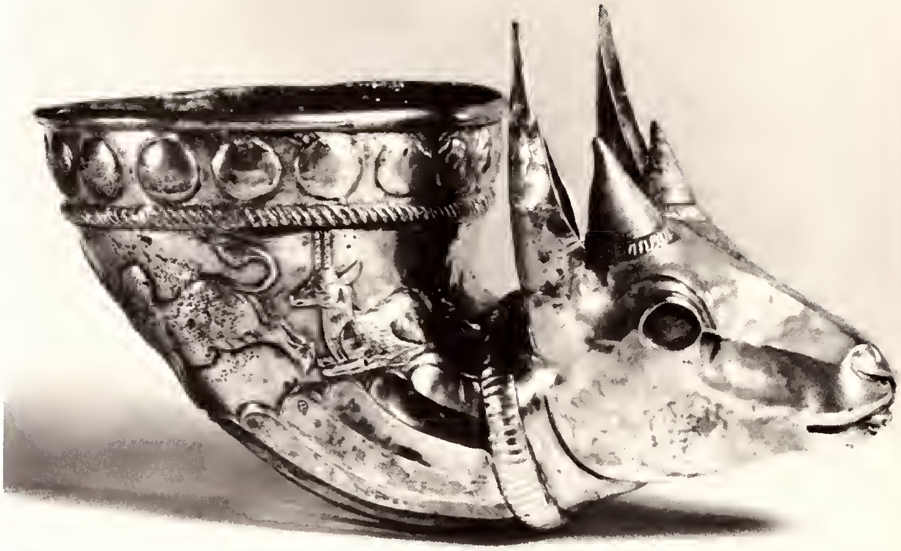
THIS VESSEL JOINS a compact horn to a gazelle protome. A short tubular spout, damaged, protrudes from the mouth. The eye sockets, now empty, once held inlays.

The lower part of the horn is fluted; the upper part, above the scalloped edge of the fluting, is decorated with a bifurcated file of animals approaching a central tree: recumbent caprid, lion, trilobed tree with sinuous trunk, humped bull, caprid. The animals' fur is represented by overall hatched lines, and the figures are spot-gilded.

Above the frieze a twisted band encircles the horn; between the band and the rim is a row of disks. The rim, added separately, is rolled over and thickened on the exterior. The twisted bands around the horns and behind the head, the nose, two flutes on the underside of the horn, and parts of the repoussé animals on the horn are gilded.

This silver rhyton is perhaps the best-known work of ancient Iranian art in the Arthur M. Sackler Gallery. Its unusual shape and decoration have provoked particular interest regarding its date and stylistic home.

The rhyton was first published by Dorothy Shepherd in 1966, before its purchase by Arthur M. Sackler. Although the rhyton was not the focus of her article, Shepherd collected important material for its date and cultural setting. She compared it with a silver rhyton combining the head of a woman with that of a buffalo. The object, which she identified as a Sogdian work of the seventh century, had at the time of her article been recently acquired by the Cleveland Museum of Art.[1] Shepherd also assembled representational evidence for similar rhyta on vessels and reliefs from Iran and Khotan in modern western China.[2] Prudence Harper provided a more detailed publication of the Sackler gazelle



rhyton in an exhibition catalogue published in 1978. She dated the rhyton to the early Sasanian period, most likely the early fourth century, and considered it to have been influenced by non-Iranian artistic sources probably located in Bactria. The species and style of the tree on the rhyton frieze, for example, with sinuous trunk and trimmed branches, illustrate a form of foliage that appears on silver vessels made in Bactria or India. She noted that a compositional analysis of the silver also pointed to a date early in the Sasanian period.[3]

A close parallel for the Sackler rhyton, although in fragmentary condition, came to light in excavations carried out in the 1960s and 1970s at Veslianski, located on the Vym River, west of the Ural Mountains.[4] This vessel was found in an early or mid-seventh-century context, providing a terminus ante quem for its manufacture. It also has a compact, fluted horn but lacks a figural frieze around the upper part of the horn. A small silver cup with a frieze of animals and foliage very similar to the one on the Sackler rhyton is in the Shelby White and Leon Levy collection. The shape of the vessel and style of decoration suggest a place of manufacture in eastern Iran or Bactria, probably in the first half of the fourth century.[5]

Detailed studies of the form and style of the Sackler Gallery rhyton, together with technical analyses of its silver composition and method of manufacture, also support a date early in the Sasanian period. The form of the rhyton, with its short, compact horn, resembles closely a late Parthian ceramic rhyton excavated at Babylon.[6] Certain technical and stylistic features, such as the use of spot gilding and overall hatched patterning of the animals' fur, are characteristic of early Sasanian silver.[7] Moreover, elemental analysis shows that the silver used in the Sackler rhyton belongs to a source found only among a group of early Sasanian vessels, dating to the third and early fourth centuries.[8]

Representations of the rhyton with a compact horn and caprid protome, however, are found mostly on objects dating to the fifth to seventh centuries. The earliest example is depicted on a silver plate found in the Punjab in 1882, now in the British Museum, London. A nude male figure wearing a wreath of vines and leaves, accompanied by a female figure, drinks from a rhyton with a gazelle protome. The bowl is certainly of Indian manufacture and probably dates to the fourth or fifth century.[9] Two representations of similar rhyta occur on Sasanian silver vessels, one on a lobed vessel in the Cleveland Museum of Art and a second on a small hemispherical bowl in the Sackler Gallery [25].[10] All other known depictions of this form of rhyton are found on objects made or found in Central Asia or China. A clay amphora of Sasanian type from Khotan, of sixth-century date, bears a molded relief roundel showing a male figure holding a gazelle rhyton.[11] A Northern Qi (A.D. 550–77) stone relief, now in the Museum of Fine Arts, Boston, depicts a group of banqueting figures identified as Sogdians, one of whom holds a gazelle rhyton with a row of disks encircling the top of the horn.[12] Of somewhat later date is a wall painting at Panjikent, probably from the first half of the eighth century, showing a banqueting figure holding a similar horn rhyton.[13] Although evidence for the continued manufacture of the horn rhyton throughout the Sasanian period is lacking from Iran itself, the Iranian horn rhyton apparently survived with a remarkable fidelity to its form and style over a period of two hundred years. Later Persian sources preserve references to the rhyton, both in the form of a complete animal as well as the horned variety.[14]

Another geographical and cultural region that seems to have been strongly influenced by the Iranian horn rhyton is Tang China (A.D. 618–906). A parallel for the form of the Sackler gazelle rhyton is a miniature agate version, recovered from a large treasure hidden at the Tang capital Chang'an, about the year A.D. 756. Although the agate rhyton has been dated as early as the Hellenistic period, it probably belongs with a group of Tang dynasty rhyta inspired by Iranian examples. The Tang vessels were made in a variety of media, including terra-cotta and jade.[15]

Caprids are also known among other silver-gilt rhyta of Sasanian date, such as the saiga antelope heads in a private collection and in the Metropolitan Museum of Art, New York.[16] Caprids, probably antelope, are among the subjects represented on Sasanian stamp seals. They also appear as quarry in some of the hunting scenes depicted on silver-gilt plates.[17]

## Technical Discussion

The rhyton was made by a combination of raising and repoussé. The horn and protome were shaped from one piece of metal. The ears of the gazelle, formed separately, were fitted into sockets on the protome. The rim is also an added piece. While toolmarks are present on the inner surface, indicating some working from the inside, the design on the horn was apparently created by sinking the background of the outer surface.

The hides of the animals were detailed using only two types of punch marks, crescents and ovals. Amalgam gilding highlights various details such as the nose and base of the gazelle's horns on the protome, the band dividing the horn and protome, and details of the raised design on the horn (head of the lion, hump of the bull, center leaf of the tree, spiral band under the rim, and two flutes on the underside of the horn). Microscopic examination of the deeply recessed eye sockets revealed no trace of the inlay they once held.

The surface condition of the vessel is testimony to its antiquity. Pitting is evident in a number of areas. Also, intergranular corrosion has occurred as the outline of grain boundaries can be seen on the surface due to its effects. The inside surface bears a few areas of heavy encrustation and small spots of malachite (copper carbonate corrosion). Patches of silver chloride are also present. The metal also looks acid etched, but this may be due to cleaning.

Some areas were repaired and reshaped, but the form seems to be true to the original. Sections of the spiral band under the rim are soldered over on the inner surface with what appears to be hard solder; solder fills the recesses of the repoussé in these areas. The outer surface of these areas of the spiral band has been regilded with amalgam gilding. The repairs appear to be ancient because they also bear corrosion products. A repair to a break across the proper right ear, however, appears to be modern. Although repaired, the ears display a number of features indicating that they are original or at least ancient; these features include their composition compared to that of the body, evidence of corrosion effects, and traces of encrustation. The joins between the ears and head are also original or at least ancient. The juncture stands in contrast with the surrounding surface due to the occurrence of preferential corrosion along the solder line, no doubt because of the higher percentage of copper being present in the solder as would be necessary to give the solder a lower melting point. The corrosion products found along the juncture consist of silver sulfide and malachite.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 96.3 |
| Copper | 3.03 |
| Gold | 0.716 |
| | PARTS PER MILLION |
| Iridium | 0.0052 |
| Zinc | 46 |
| Tin | 63 |

| | PARTS PER MILLION |
|---|---|
| Arsenic | 2.2 |
| Antimony | 3.4 |
| Selenium | 0.51 |
| Iron | 39 |
| Cobalt | 0.26 |
| Mercury | 0.67 |
| Chromium | 0.66 |
| Scandium | 0.0031 |

As determined by surface analysis using energy-dispersive X-ray fluorescence:

| | Body* | Rim** | Proper left ear** |
|---|---|---|---|
| | PERCENT | | |
| Silver | 97 | 97 | 96 |
| Copper | 1.7 | 1.6 | 2.2 |
| Gold | 0.9 | 0.9 | 1.0 |
| Lead | 0.6 | 0.6 | 0.5 |

* Average of two measurements.

** One measurement.

### Notes

1. Shepherd 1966, front cover, figs. 1, 3. Carter 1979 has argued for an origin in Afghanistan or northwestern India.

2. Shepherd 1966, esp. 294–95, 300.

3. Harper 1978, 36–38, no. 5; additional comments in Harper 1989, 857 n. 20; Prudence Harper in Bothmer 1990, 57. Melikian-Chirvani 1982, 280 with n. 72, was informed that the rhyton was purchased in Tehran; its alleged source was the southwest Caspian region.

4. Sabeleva 1979, 95, fig. 3; this reference is cited in Harper 1988b, 157 n. 37.

5. Prudence Harper in Bothmer 1990, 57, no. 42.

6. Ettinghausen 1964–65, 2: 659, 7: pl. 184d. Also Koldewey 1914, 254–55. For an antecedent dating to the Achaemenid period, a silver-gilt rhyton from Bulgaria: *L'or des cavaliers thraces* 1987, 239, no. 423.

7. Harper and Meyers 1981, 157. An example of the rows of hatched lines and spot gilding is found on the British

Museum Shapur plate, which probably dates to the fourth century: Harper and Meyers 1981, pl. 13.

8. Harper 1978, 38, citing the work of Pieter Meyers. The elemental composition is given in the Technical Discussion.

9. Dalton 1964, 58–59, no. 204, pl. XXXIII, has suggested a date in the third or fourth century. Harper 1978, 47, has proposed a date in the fourth or fifth century, noting many elements of Sasanian influence. Carter 1968, 132–34, discusses Kushan and Sasanian elements in the decoration of the bowl.

10. The Cleveland vessel is illustrated in Shepherd 1966, 300, fig. 12.

11. The medallion is illustrated in Shepherd 1966, 301, fig. 14B. The Khotan jar is in the Museum für Indische Kunst, Berlin.

12. Scaglia 1958. A silver plate in the collection of Noriyoshi Horiuchi is decorated with a male figure holding a rhyton with gazelle protome: Horiuchi 1989, no. 38.

13. *Oxus* 1989, 120, no. 71.

14. Melikian-Chirvani 1982, 263–92; the terms *bālog* or *pālog* in eleventh-century Persian lexicons refer to the horn rhyton with animal protome.

15. Parlasca 1975, 280–86, argued that the miniature agate rhyton is a product of a Ptolemaic workshop of the second century B.C.

16. Harper 1978, 56–57, no. 16, with further references; also Kent and Painter 1977, 152, no. 319.

17. Brunner 1978b, 100–101.

# 39

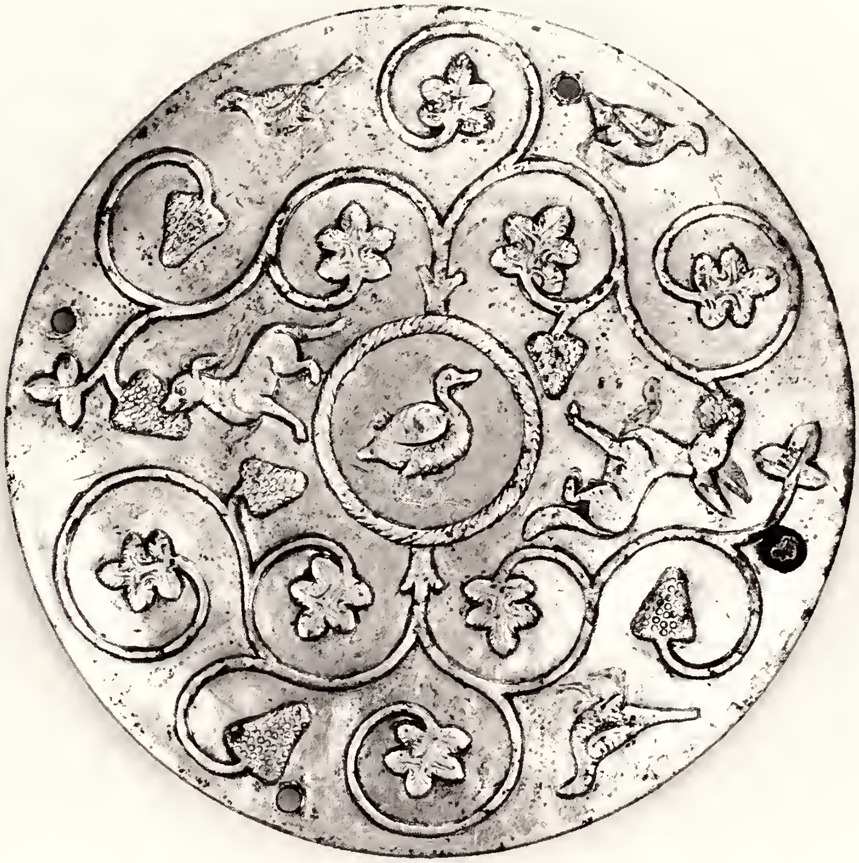
## *Roundel*

6th–7th century A.D.
Silver and gilt: hammered, carved, chased, gilded
Height 1.3 cm
Diameter 12.4 cm
Weight 136 g

Arthur M. Sackler Gallery, S1987.107
Gift of Arthur M. Sackler, 1982

*Exhibited:* Asia Society Gallery, New York, 1978; Arthur M. Sackler Gallery, from 1987.

*Published:* Harper 1978, 62, no. 19; Lawton et al. 1987, 54, no. 24.



THE EXTERIOR SURFACE of this hollow roundel, including the sides, is entirely gilded. The decoration on the upper surface is carved in low relief. A central medallion with a ropelike border encircles a duck facing right. Above and below the medallion extend vines inhabited by birds; to the sides are two animals, a hunting dog and a jackal, eating bunches of grapes. One of the original pins that filled the four perforations spaced evenly around the roundel's circumference at slightly varying distances from the edge is preserved.

An object similar in size and form, also decorated with a central medallion enclosing a duck surrounded by inhabited vines and reportedly from northwestern Iran, is in the Bastan Museum, Tehran.[1] A similar approach to the decoration of a circular field is found on late Sasanian silver-gilt plate interiors. An inhabited vine covers the interior of a plate in the Toledo Museum of Art.[2] An inhabited vine scroll surrounds a central medallion enclosing a bird on a late Sasanian plate in the Hermitage Museum, Saint Petersburg.[3] This decorative treatment is documented in stucco patterns of the fifth to seventh centuries.[4]

The Sackler Gallery roundel is perforated for attachment to another object or material. In form it resembles a shallow lid. The roundel in Tehran lacks such perforations. Circular box lids made of silver with gilded decoration, also without perforations, have been found in northern China in contexts datable to the sixth and seventh centuries.[5]

## Technical Discussion

The roundel was formed from one sheet of hammered silver. Four equilaterally spaced holes were made near the rim by perforating the roundel from the inside surface. It is clear that the holes were made after the roundel was gilded because the edges of the holes are ragged and curl up over the surrounding gilded surface on the top. One hole is filled with the remnant of a silver, round-headed pin. A dendritic structure is apparent on the head of the pin, indicating that it was cast. The pin was broken off and extends below the inside surface.

The raised decoration on the roundel, given that the roundel was formed by hammering, must have been formed by carving and chasing. The metal is uniformly thick. Recessed areas measure about 1.3 millimeters thick, while the raised areas measure about 1.65 to 1.85 millimeters thick. Thus the difference between the raised and recessed areas is only 0.5 millimeters. The sides are much thinner, measuring about 0.8 millimeters thick. Decorative details were chased, with frequent use made of ring and dot punches. Both chasing and engraving appear to have been used to outline areas of the design, such as the vines, which have a beveled edge and a radiographic appearance that suggests engraving. Amalgam gilding was applied to the background after it was chased.

Malachite (copper carbonate corrosion) almost totally covers the smooth inside surface of the roundel. Traces of red copper oxide, green copper carbonate, and black silver sulfide corrosion are also present in many areas on the outside surface. Some surface areas are etched and pitted, indicative of silver corrosion processes. Losses to the gilding layer and a fair amount of wear are also apparent.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 92.6 |
| Copper | 6.73 |
| Gold | 0.653 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.071 |
| Zinc | 320 |
| Tin | 670 |
| Arsenic | 19 |
| Antimony | 25 |
| Selenium | 7.7 |
| Iron | <9.8 |
| Cobalt | 0.13 |
| Mercury | 2.3 |
| Chromium | 0.28 |
| Scandium | 0.0068 |

## Notes

1. Pope 1964–65, 7: pl. 215A.

2. Grabar 1967, 134, no. 51. Compare also the decoration on the large silver-gilt disk in the Sackler Gallery collection [40].

3. Orbeli and Trever 1935, pl. 28.

4. Kröger 1982, pl. 94, fig. 6.

5. Shih Hsio-yen 1983, 75, pls. 57–59. The boxes, decorated with bird and floral patterns, were found near Xi'an. The author suggests that they were made in China, inspired by patterns probably of Central Asian origin.

# 40

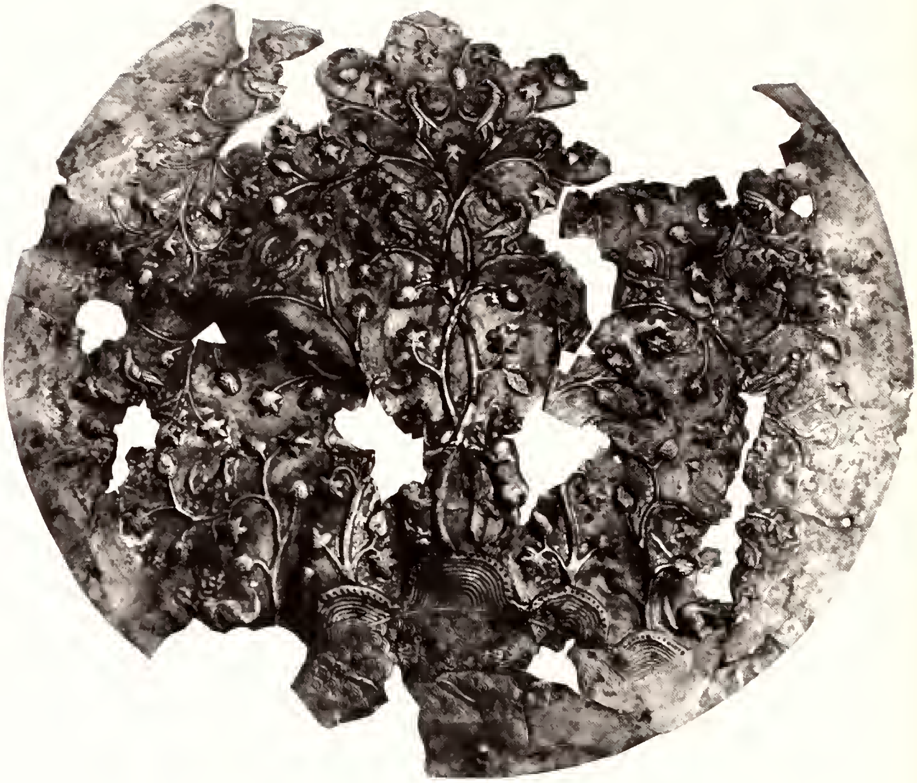
## *Disk*

6th–7th century A.D.
Silver and gilt: hammered, chased, gilded
Diameter approx. 43 cm
Thickness approx. 0.5 mm

Arthur M. Sackler Gallery, S1987.139
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Unpublished*



AN EXTENDED INHABITED VINE decorates the entire surface of this large, generally flat disk. At the bottom, a scale pattern representing water and populated with fish and birds fills a segment of a circle; concentric lobes form a stylized mountain. From the central lobe rises a pair of intertwining vine stems branching to the right and left; the vine stems are flanked by rampant bears, their bodies turned toward the trunks and heads turned away. A single trunk grows out of each lobe. The vines are heavily inhabited by birds in a variety of poses, some with tail feathers or wings raised, some with heads turned away from the body. In the lower right and left are jackals.

Traces of gilding are preserved on the background and around the figures, indicating that the raised decoration was originally gilded.

Around the circumference are circular perforations in a plain band 2.5 to 3 centimeters wide, spaced regularly at intervals of about 7 centimeters; twelve perforations, each 1 centimeter from the rim, are preserved.

This disk has no typological parallels in Sasanian metalwork. In the ancient Near East, disks made of sheet metal with repoussé decoration could serve as shield bosses. But the Sackler disk is much larger and flatter than most preserved shield bosses or examples depicted in ancient representations.[1] Most likely it adorned part of a building or a piece of furniture or other object, attached by means of rivets through the circular perforations around the rim.

The composition of the decoration—inhabited vines with intertwined branches, flanked by rampant animals—is common in late Sasanian decorative arts. A similar decorative treatment is documented in stucco patterns of the fifth to seventh centuries.[2] The patterned mountains from which the vines grow are found on a number of Sasanian silver vessels.

The subject and style of the decoration suggest a date late in the Sasanian period, probably the seventh century.

## Technical Discussion

The present surface condition of the disk allows little to be determined conclusively about the working techniques used to shape the object. Radiography and visual examination, however, reveal that the disk was formed by hammering and decorated by chasing. Traces of what appear to be gilding are present in a number of areas.

The surface of the disk is now undulating in character; originally it appears to have been slightly convex. Where it is possible to measure the thickness of the disk, it is only about 0.5 millimeters thick. Twelve holes measuring about 5 millimeters across are present running along the rim with a distance between them of about 7 to 7.5 centimeters. Assuming that the disk was once completely circular, nineteen holes in total would have been present.

Corrosion has resulted in the formation of numerous cracks and losses as well as great loss of surface detail. Previous restoration has included the addition of four large metal fills in the central area of the disk that mimic the original surface decoration; the fills measure about 4–6 centimeters long and 2–4 centimeters wide. A backing material from a modern restoration has been recently removed and replaced.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 92.4 |
| Copper | 7.28 |
| Gold | 0.349 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.0074 |
| Zinc | 16 |
| Tin | <39 |
| Arsenic | 52 |
| Antimony | 37 |
| Selenium | 3.5 |
| Iron | 5.0 |
| Cobalt | 0.19 |
| Mercury | 0.14 |
| Chromium | 0.42 |
| Scandium | <0.0022 |

## Notes

1. For example, the Sasanian silver boss in the British Museum: Kent and Painter 1977, 155, no. 325.

2. Kröger 1982, pl. 39, fig. 3.

# 41

## *Handle and chapes*

7th century A.D.
Gold: hammered, chased, granulated
*Handle parts (S1987.200a, b)*
Height 19.6 cm
Width 5 cm
Depth 1.8 cm
*Upper chape assemblage (S1987.200c–e)*
Height 5.6 cm
Width 7.8 cm
Depth 3.3 cm
*Lower chape assemblage (S1987.200f–i)*
Height 61.1 cm
Width 8.2 cm
Depth 2.5 cm
Weight 671 g (includes wood and leather mounting)

Arthur M. Sackler Gallery, S1987.200a–i
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

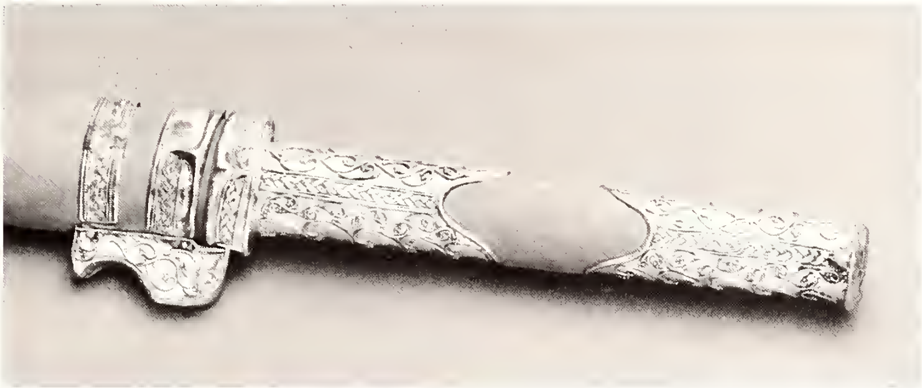
*Published:* Lawton et al. 1987, 56, no. 26a.

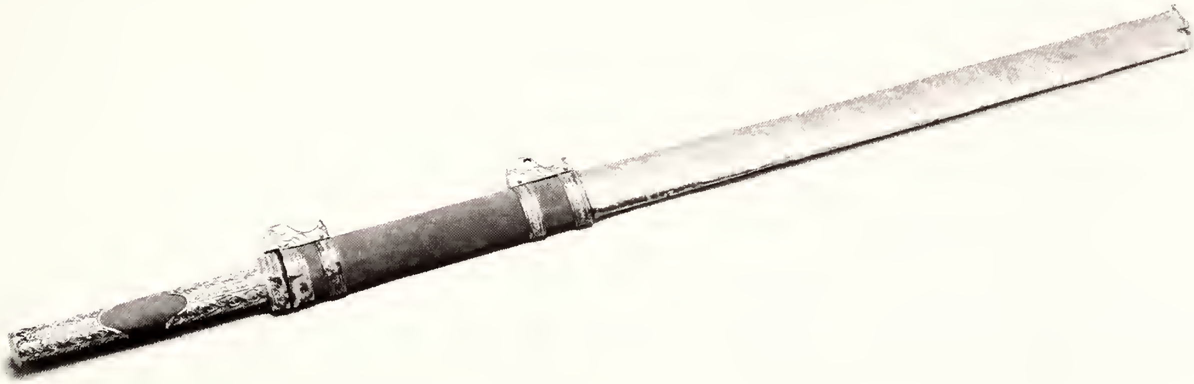
THESE FITTINGS ORIGINALLY decorated the hilt and scabbard or sheath of a long sword probably made of iron, now missing. The handle is decorated with twisted wire and granulation to form a central braid surrounded by a scroll and vegetal pattern. These patterns are repeated on the metal trimming attached to the two P-shaped mounts. The lower chape is plain, with a rectangular tip.

The handle and chapes were allegedly found with a silver-gilt buckle and set of gold lappet fittings [42].

A number of long swords with iron blades and gold- or silver-covered wooden hilts and scabbards survive from the Sasanian period; most were allegedly found in northwestern Iran. Several, like the Sackler Gallery example, bear elaborate decoration in fine metalwork techniques such as granulation; others also preserve glass or gemstone inlays.[1]

Swords were an important royal emblem in Sasanian Iran, prominently displayed along with other royal equipment such as the crown. Details of their forms were closely observed and reproduced in royal representations.[2] Most Sasanian swords hung from a slide attached to the center of the scabbard or





were attached to the belt by straps passing through loops on both sides. The Sackler Gallery example, together with a few other swords with gold or silver scabbards allegedly found in northwestern Iran, was suspended by means of the two P-shaped mounts along the scabbard.[3] The only known Sasanian representation of such a sword occurs on one of the hunting reliefs in the grotto at Taq-i Bustan, where it is worn by a royal hunter.[4] The P-shaped mounts were intended to keep the sword at an oblique angle. This form of sword suspension seems to have reached the Sasanians from the Central Asian Hephthalites, probably during the late fourth or early fifth century. A gold P-shaped mount, decorated with granulation and stone inlay, was part of the Pereshchepina hoard found north of the Black Sea, where it was probably buried around the mid-seventh century.[5]

## Technical Discussion

The basic construction of the chapes consists of gold sheet to which wire and granulation have been added. Nine major parts make up the chapes. The sheet is thin, and the gold, being nearly pure, is very soft. Thus the gold sheet could not alone support a blade but no other material that the sheet would have covered is evident. The tubular-shaped handle and terminal are, respectively, circular and ovoid in cross section. Curving, pointed decorative elements formed from sheet decorate one side of each end of the handle and terminal. Sheet was also used for making the P-shaped elements suspended by bands between the terminal and handle. The P-shaped elements are hollow and open on the side that would meet the scabbard. Hard solder was used to join the various sections of sheet and attach the added elements.

Strip-twisted wire was used in curved, beaded, and braided forms. Granulation, in groupings of three grains, was combined with curving wire to create vegetal forms. Regular hard soldering rather than colloidal hard soldering appears to have been used to attach the granules.

Many tears and losses have occurred to the sheet of the chapes. Embedded in one of the many areas of earth encrustation is a reddish brown accretion with structural features, that suggest it may be the remains of wood or iron. At the time the chapes were acquired by the museum, they were attached to a modern wooden support from which the handle could not be removed. The end of the terminal was deformed and has been subsequently reshaped.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence:

|  | Sheath* | Handle** | Area believed to be solder** |
|---|---|---|---|
|  | PERCENT |  |  |
| Gold | 98 | 98 | 91 |
| Silver | 1 | 1 | 7 |
| Copper | 0.7 | 0.8 | 2 |

* Average of two measurements.

** One measurement.

## Notes

1. Harper 1978, 83–84, no. 28.

2. Harper 1978, 83–84; Overlaet 1989, 741–55.

3. A similar sword in the Metropolitan Museum of Art is discussed in Harper 1978, 83–84; her n3 lists additional examples purchased on the antiquities market.

4. Harper 1978, 83; the relief is illustrated in Trousdale 1975, 99, fig. 79.

5. Balint 1989, 97, fig. 42: 10.

# 42

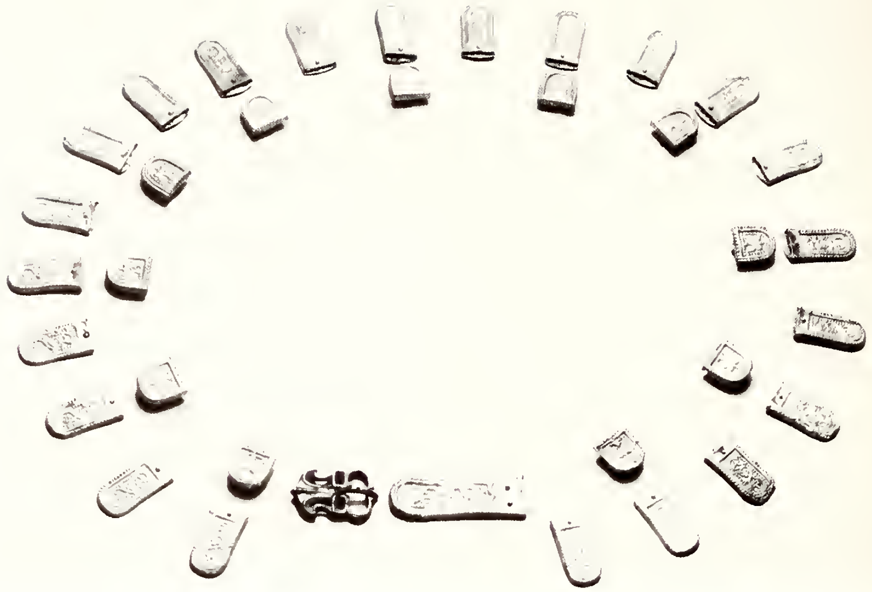
## *Belt buckle and lappet fittings*

7th century A.D.
Silver and gilt *(buckle)* and gold:
hammered, chased, traced
*Buckle (s1987.201a)*
Length 5.3 cm
Width 3.5 cm
Thickness 1.3 cm
Weight 27.7 g
*End lappet (s1987.201x)*
Length 8.5 cm
Width 2.8 cm
Thickness 0.7 cm
Weight 22.0 g (contains leather remains)
*Long ornaments (s1987.201b–w)*
Average length 4.8 cm
Width 2.3 cm
Thickness 0.4 cm
Weight 5–11 g (some contain leather remains)
*Short ornaments (s1987.201y–ii)*
Average length 2.8 cm
Average width 2.5 cm
Average thickness 0.5 cm
Weight 3.5–5.5 g

Arthur M. Sackler Gallery, s1987.201a–ii
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Lawton et al. 1987, 56, no. 26b.



THE SILVER-GILT BUCKLE ends in a floral form. A set of gold lappet fittings, allegedly found with the buckle, consists of an end tab, eleven short ornaments, and twenty-two long ornaments. Approximately oval in shape, each fitting is decorated with two rows of continuous dots enclosing a vine-scroll pattern. On the front of each long ornament and the end tab is a narrow plain band perforated for attachment to a leather belt by means of small gold nails.

This group of ornamented gold fittings would have covered lappets made of some other material, perhaps wood or leather, worn suspended from a belt. Several of the lappet fittings, in fact, preserved bits of leather. Belts of this type are Central Asian in origin and are frequently depicted there in wall paintings and other representations. They are worn by the royal figure who appears in reliefs in the Sasanian grotto at Taq-i Bustan in western Iran. The belt with lappets is associated with a type of sword suspension that employs P-shaped mounts to attach the scabbard to the belt [see 41]. Excavated examples of the belt with lappets have been found in tombs of the Avars in Hungary.[1] Only one belt buckle has been recovered from a scientifically excavated Sasanian context. A belt buckle made of iron, decorated in part with gold leaf, was found in a fourth-century context at Susa.[2]

The decoration on the ornaments, continuous dots enclosing floral and vine motifs, resembles that on the walls of a green-glazed ceramic vessel of the Sasanian period.[3]

The Sackler belt buckle and fittings were allegedly found in Iran, together with the gold handle and chapes [41]. A similar set of gold belt fittings, also allegedly found in Iran, is now in the British Museum, London.[4]

## Technical Discussion

All the various ornaments were formed from gold sheet, with the exception of the buckle. Each small ornament consists of one piece of metal with two U-shaped pins soldered to the back to attach the ornament to a belt. The edges of the small ornaments were folded over to form the sides and were left hollow in the back. More toolmarks are apparent on the front surfaces than on the backs, and the surfaces of the backs of the ornaments appear somewhat rough. Therefore, while repoussé may have been used to create the basic shape, chasing and tracing appears to have been used extensively to complete the form and decoration.

Two pieces of sheet comprise each large ornament and the terminal, with the top sheet bent over along the edge to form the sides and the back sheet soldered to it. A gold nail, passing through two perforations at the top of each ornament, was used to attach an ornament to a belt. The nails are generally more than two centimeters in length and are square in cross section with round heads attached by soldering. Most large ornaments contain remnants of leather. While new leather is obvious in some ornaments, many leather remnants appear to be old. The silver buckle appears cast and bears amalgam gilding.

Green copper corrosion, malachite, covers much of the surface of the buckle. The ornaments are in generally good condition. Some wear and random nicks and dents are apparent. A random selection from the small and large ornaments was used for analysis. The compositions differ for the front and back sheets, and a baser alloy was used for the undecorated back sheets.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | Obverse of two ornaments | Reverse of two ornaments |
|---|---|---|
| | PERCENT | |
| Gold | 97 | 90 |
| Silver | 3 | 8 |
| Copper | 1 | 3 |

## Notes

1. Peck 1969, 117–20; Trousdale 1975, 94–102; Ghirshman 1979, 182–87.

2. Ghirshman 1979, 184, fig. 2.

3. Fukai 1981, 36–37, fig. 42.

4. Barnett and Curtis 1973, 127–28, pl. LIXB.

# *Suspected Forgeries*

# 43

## *Two vessel handles*

Gold: repoussé, chased, traced
63.15
Length 19.6 cm
Weight 135 g
64.6
Length 22.6 cm; length of animal 19.8 cm
Weight 125 g

Freer Gallery of Art, 63.15 and 64.6
Purchased from K. Rabenou, 1963, 1964

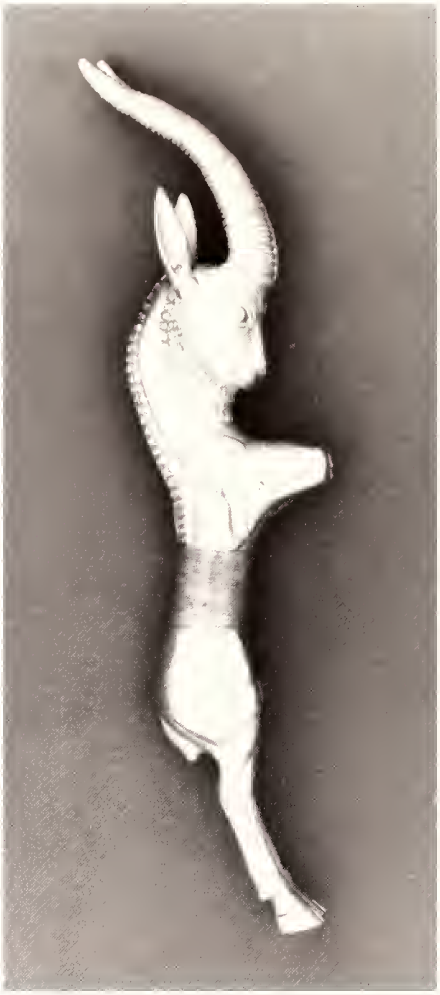
*Exhibited:* Freer Gallery of Art, from 1964.

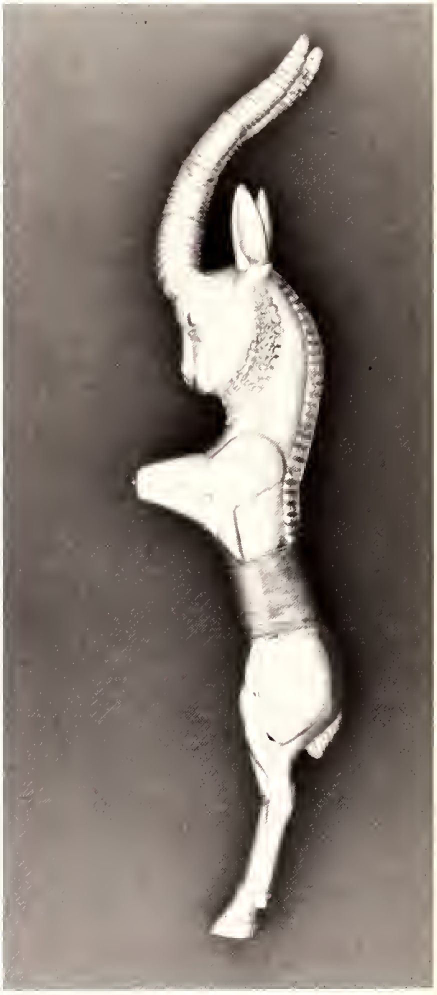
*Published:* Ghirshman 1960, 550; Huot 1965, fig. 140; Atil 1971, no. 40; Muscarella 1977, 179, no. 105.

TWO ALMOST IDENTICAL hollow handles made of sheet metal are each in the form of a rampant ibex. The forelegs are tucked under the forepart of the body; the hind legs are incorporated into the shape of the handle. Patterned areas indicate the base of the horns, beard, and fur from the back of the neck to the center of the back; parallel ridges mark the horns. Parallel strands of wrapped wire form a wide band around the middle of the animal. Stylized markings indicate the haunches, hind legs, and tail. The upper and lower lids of the eyes are delineated; the brow is rendered by parallel shallow ridges. A small chased circle marks each corner of the mouth.

One of the handles (64.6) preserves a short tubular sheet metal attachment, spirally fluted, extending from the rear hooves of the ibex; the lower edge of the tube is broken.

These handles belong to a distinctive vessel type of the Achaemenid period, one of the few that is relatively well documented. Tribute-bearers holding an amphora with zoomorphic handles are depicted on the reliefs of the Apadana



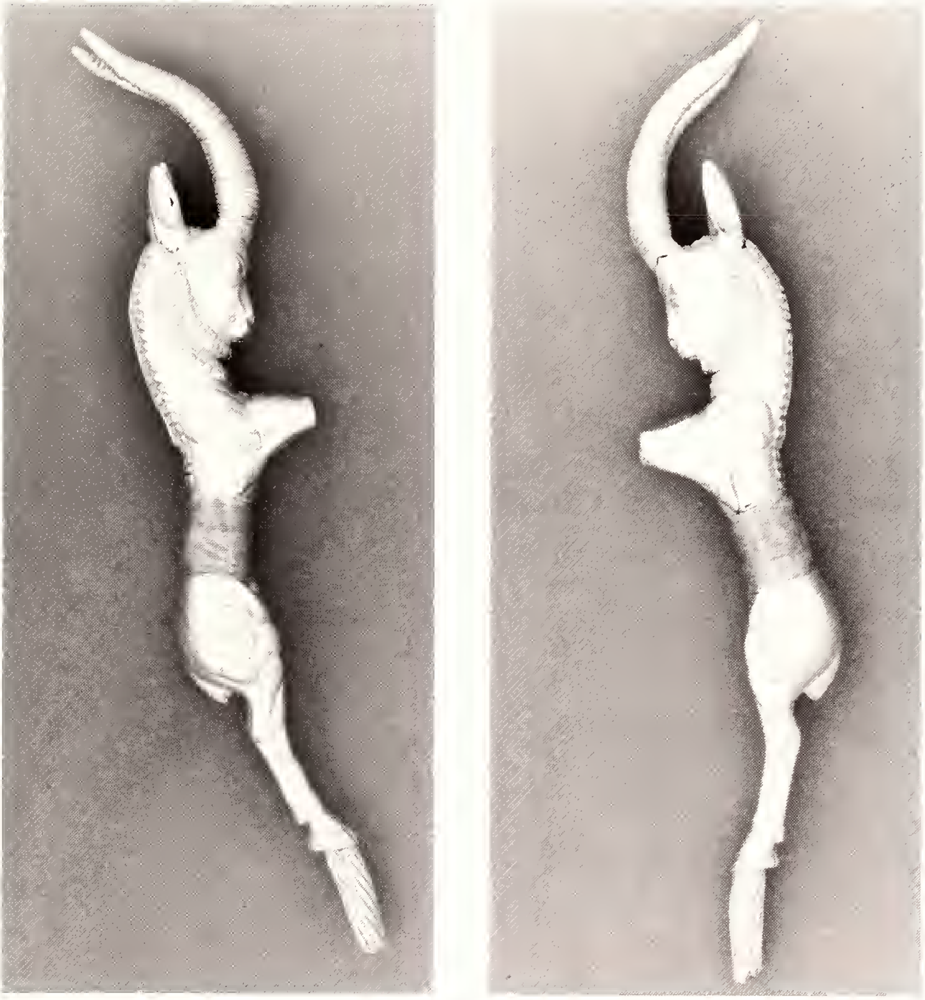


at Persepolis.[1] Actual examples of the vessel type, made of silver or gold, have reportedly been recovered from a wide area of the Achaemenid Empire, although very few are from controlled excavations.[2]

Several features of the Freer handles seem inconsistent with Achaemenid gold plate and almost certainly indicate a modern date for their manufacture. First, among Achaemenid zoomorphic handles of undisputed authenticity, the head of the rampant animal is usually turned away from the body.[3] Second, the Freer handles lack the rich surface detail of gold objects reliably dated to the Achaemenid period, including those in the Oxus treasure.[4] Technical study of the handles, as described below, contributes additional uncertainty that the objects are ancient.

## Technical Discussion

Each handle is composed of two halves with seams running down the center lines of the front and back. The halves appear to have been formed by repoussé.



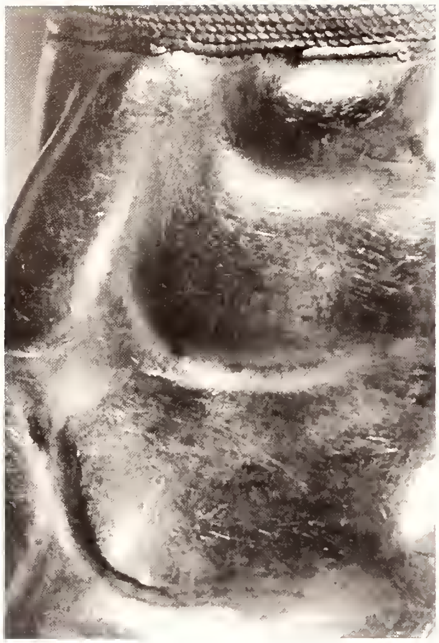


Fig. 1. Side of one ibex handle showing alternating areas of polished and matte surfaces.

The ears and horns were made separately, and all the various parts were soldered together using hard solder. Remnants of hard solder are also found on the ends of the truncated upper legs. Strands of twisted wire were wrapped around the midsection of each ibex and soldered in place. The wire is fine and very regular in diameter. What appear to be drawing marks, parallel striations along the length of the wire, are present. Details on the handles were executed by chasing. Some outlines of the forms were sharpened by tracing.

The condition of the handles is generally very good. Breaks are present along the seam lines and minor dents and scratches are apparent. A few areas of soldered repair are found. The metal has an even, lightly etched appearance, except on the high points of the forms (fig. 1). This etched appearance appears often on gold objects when strongly acidic solutions have been applied for cleaning or to simulate the effects of age (see also [44]).

The presence of drawing marks on the wire decoration strongly suggests that the handles are not ancient. No evidence exists to indicate that drawn wire was employed during the Achaemenid period; the use of drawn wire in this area began many hundreds of years later. The lack of wear and etched surface also indicate recent manufacture. The elemental compositions of the handles are not in any way distinctive. Analyses of the metal and solder did not indicate cadmium (a typical component of modern gold solders), the presence of which would further suggest that the handles were of modern construction.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence:

| | 63.15* | 64.6** |
|---|---|---|
| | PERCENT | |
| Gold | 95 | 95 |
| Silver | 2 | 2 |
| Copper | 3 | 3 |

* Average of two measurements.
** Average of three measurements.

## Notes

1. Schmidt 1957, 95. Compare the handles on a vessel depicted in a tomb painting at Karaburun, near Elmalı in southwestern Turkey: Mellink 1973, pl. 44, fig. 6.

2. Amandry 1959 surveys the Achaemenid amphora and its variations.

3. Examples include the pair now in Paris and Berlin: Porada 1965, 171, pl. 50. An intact silver-gilt amphora recovered from a late fourth-century context in Bulgaria is illustrated in *L'or des cavaliers thraces* 1987, 149, 155, no. 204. Muscarella 1980, 28 n. 8, made a similar observation and noted that the Persepolis reliefs also depict the vessel handles in addorsed fashion.

4. Dalton 1964; Mitchell 1989.

# 44

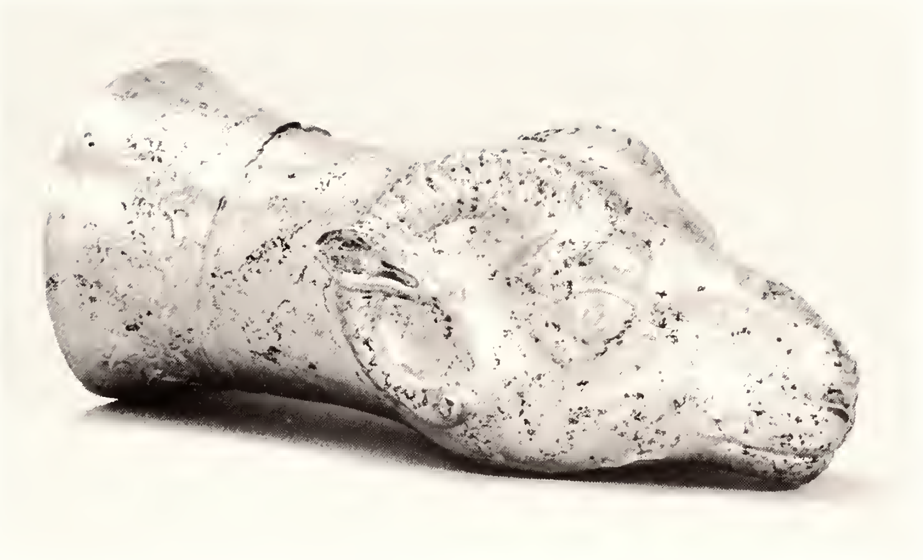
## *Drinking vessel*

Gold: hammered, chased, repoussé
Length 14.9 cm
Width 6.6 cm
Rim diameter 6.6 cm
Weight 126 g

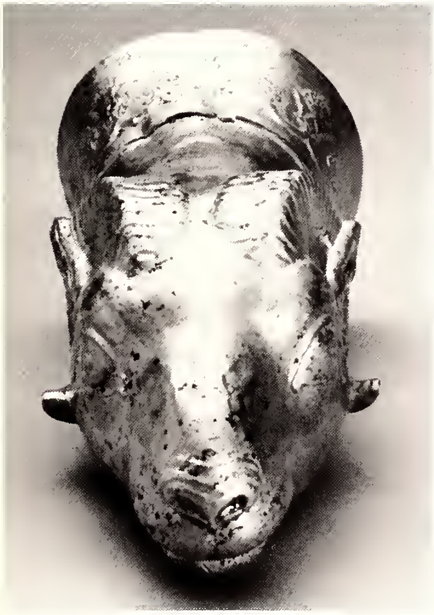
Arthur M. Sackler Gallery, S1987.32
Gift of Arthur M. Sackler, 1982

*Exhibited:* Arthur M. Sackler Gallery, from 1987.

*Published:* Gunter 1987, 41, fig. 5; Gunter 1988, 27, fig. 9.



ONE END OF THIS small vessel is in the form of a ram's head. Around the open, slightly flaring rim, is a repoussé lotus-and-palmette pattern. The horns of the ram, rendered with parallel wavy lines, curl behind the ears and protrude from the vessel wall. The eyes are outlined, without pupils indicated; the nostrils are slightly flared.



Small drinking vessels made of metal, with one end formed as the head of an animal, have been excavated at the site of Hasanlu in northwestern Iran in levels dating to the ninth century B.C.[1] They are related to but distinct from the group of bronze situlae ending in the form of an animal's head known from ninth- and eighth-century B.C. contexts at the Phrygian capital of Gordion in central Turkey and depicted in eighth-century B.C. Neo-Assyrian reliefs.[2] The Sackler gold vessel belongs to the group often called beaker rhyta, cups with one end formed as the head of an animal. Examples made of precious metal attributed to the Achaemenid period include a silver-gilt horse's head in the Metropolitan Museum of Art, New York, and a silver ram's head in the Hermitage Museum, Saint Petersburg, both dated to the fifth or fourth century B.C.[3]

The Sackler ram's-head vessel has no close parallels, however, for its type, material, and style. No examples of this form, made of gold and of comparable dimensions, have been published from major collections. A gold rhyton in the Metropolitan Museum, allegedly from Hamadan in western Iran, is of the horn variety that appears to be an Achaemenid innovation.[4] Examples made of silver, such as those in the Metropolitan Museum and the Hermitage, display richer details and surface modeling as well as more complicated techniques of manufacture. The heads of both of these animals have separately made ears attached to openings cut in the sheet metal. In addition, the Metropolitan head is equipped with a spout. In style and modeling, the Hermitage vessel is clearly related to Achaemenid court art known in monumental forms among the sculptures at Persepolis.

Achaemenid gold vessels and jewelry of undisputed authenticity exhibit greater surface modeling and decoration and often bear additional polychrome inlay. Examples of this style and technique are preserved in the Oxus treasure.[5] The lack of fine detail and the shallow surface modeling of the Sackler gold cup, together with technical observations discussed below, point to a modern date for its manufacture.

## Technical Discussion

The ram's head was formed from one piece of metal. No seams are apparent except on the inside edge of the opening, where the metal was bent back over itself to thicken and finish the rim. The wall of the rim measures roughly twice that found in other areas of the object (0.9 mm as opposed to 0.5 mm).

The floral band standing in relief just below the rim was created by chasing. The edges of the tooling, however, are much sharper on the inner surface than the outer, and the tooling of the details appears shallow and indistinct (except around the base of the horns). The reason for this feature appears to be that the outer surface was further worked after chasing, which partially flattened the relief.

Various nicks, dents, and scratches are distributed rather uniformly over the surface. Cracks are present in a number of areas. Three short cracks run down from and perpendicular to the rim. A long crack runs about half the distance around the circumference of the object along the raised band separating the floral pattern from the details of the ram's head. Smaller breaks in the metal are also present and numerous. What appears to be hard solder is found in a few spots on the floral relief band, and it may have been used to repair tears in the metal in these areas of tooling; the spots of solder are unfinished on the inner surface and smoothed over on the outer surface.

A specular appearance, suggesting that the metal has been acid-etched, is found over the whole of the inner surface and in the recessed areas on the outer surface. The adjacent raised areas bear fine striations and have a less matte, more polished appearance. Earth encrustation is found as well as small spots of a dark reddish brown encrustation that cover both raised and recessed areas of much of the surface.

## Composition

As determined by surface analysis using energy-dispersive X-ray fluorescence (average of two measurements):

| | PERCENT |
|---|---|
| Gold | 98 |
| Silver | 0.9 |
| Copper | 0.8 |

## Notes

1. Porada 1965, pl. 32 (cup in the form of a ram's head, made of copper alloy).

2. Young 1982, 121–23, with further references; Calmeyer 1979.

3. Wilkinson 1948–49, 196, above. The vessel in the Hermitage Museum was first published in Smirnov 1909, pl. v, no. 17. See also the discussion by Calmeyer 1979.

4. Wilkinson 1954–55, 222.

5. Dalton 1964, including a discussion of Achaemenid precious metalwork recovered from Susa.

# 45

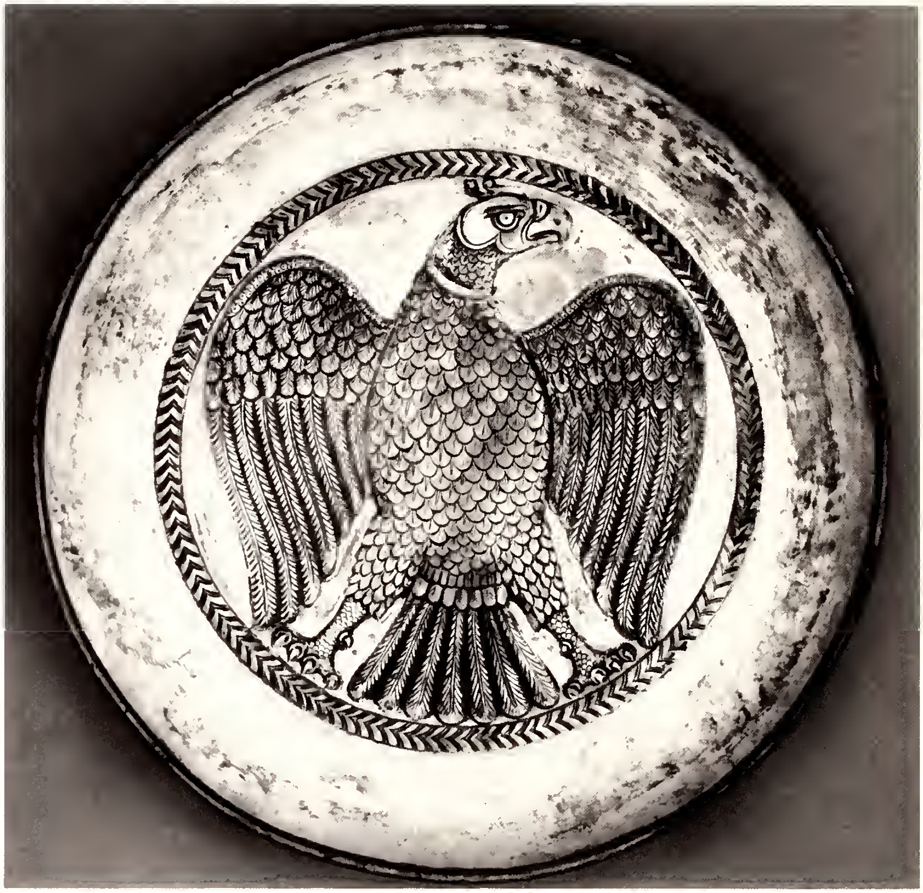
## *Plate*

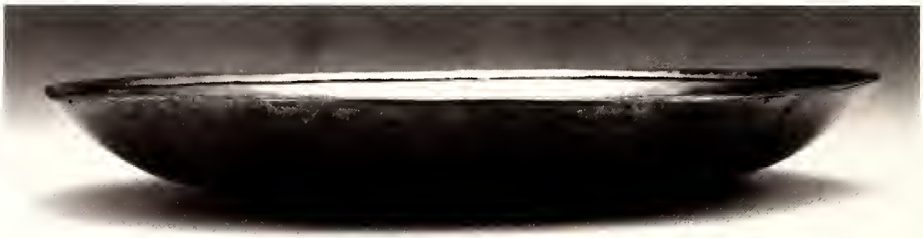
Silver and gilt: hammered, gilded, double shell
Height 4.4 cm
Rim diameter 28.2 cm
Weight 1,256 g

Freer Gallery of Art, 58.7
Purchased from Elie Borowski, 1958

*Exhibited:* Freer Gallery of Art, from 1959.

*Published:* Melikian-Chirvani 1969, 2–9, pl. 11; Shepherd 1972, 346.





A WREATH PATTERN defines a large circular field within the interior of this large, shallow plate with a rounded base. A displayed eagle, in low relief, fills the circular field. Feathers on the body, legs, and wings are detailed. The wreath border, the surface interior of the tondo, and the band around the eagle's neck are gilded. The exterior is plain.

A. S. Melikian-Chirvani referred to this plate in an article in which he proposed a Sasanian date for a bronze eagle sculpture in the Berlin Museum. He cited the Freer plate, together with a silver plate in the Adolphe Stoclet collection, Brussels, as examples of the Sasanian type and style of eagle. He also observed, however, that in style the Freer plate "would seem to be later than the end of the Sasanian empire" and added that "scholarly opinion is not altogether unanimous about the object."[1]

Neither typological, technical, nor stylistic features of this plate can be paralleled in the known Sasanian repertory. The shape of the plate, with its large dimensions and lack of ring foot, is highly unusual. In addition, the technique of manufacture with a double shell place it outside known examples of Sasanian or Central Asian metalwork. The rendering of the eagle also differs markedly from Sasanian examples. The eagle was depicted frequently on Sasanian seals and gems and was also shown on a few silver-gilt vessels. Characteristically the bird was shown with a short triangular "tail feather," a feature lacking on the Freer plate.[2] The absence of parallels for the form of the vessel, technique of manufacture, decoration, or style argues for a modern date.

## Technical Discussion

The plate has a double shell construction; the inner surface is a separate piece of metal set into a second piece of metal, which forms the outer wall. The edge of the outer wall was then folded over the edge of the inner wall to secure the inset piece and form a thick rim. Radiographs of the vessel reveal that the basic form of the plate was executed by hammering; the density of the metal is irregular, and oval depressions, the result of individual hammer blows, run in annular patterns around the center of the plate. A centering mark is found on the outside surface. No evidence exists to suggest that a foot was once attached to the surface; no remnants of solder indicate where a foot would have been nor are there any depressions or marks on the surface from the previous presence of a foot.

Details on the eagle and surrounding band were formed by chasing. An incomplete gilding layer covers the recessed areas and rim of the inside surface. The microscopic appearance of the gilding indicates that it is amalgam gilding. Gilding fills a number of the toolmarks on the eagle, revealing that the gilding was applied after the tooling.

Although the surface is slightly tarnished and the gilding is worn, evidence of prolonged corrosion or extensive wear is not apparent. The outer wall bears some seemingly random scratches and has a slightly undulating surface, but the general lack of corrosion effects and wear, combined with the method of construction used for the vessel, argues against the antiquity of the object. The composition of the metal is not distinctive.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 95.9 |
| Copper | 3.66 |
| Gold | 0.425 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.019 |
| Zinc | 20 |
| Tin | <37 |
| Arsenic | 97 |
| Antimony | 32 |
| Selenium | 3.8 |
| Iron | 18 |
| Cobalt | 0.060 |
| Mercury | 17 |
| Chromium | 0.29 |
| Scandium | 0.0055 |

## Notes

1. Melikian-Chirvani 1969, esp. 2–5, 3 n. 6.

2. My thanks to Boris Marshak for pointing out this feature. Eagles represented on Sasanian silver vessels are well illustrated in Trever and Lukonin 1987, pls. 89, 95–97. For the eagle in Sasanian tradition and art, see Brunner 1978b, 104–7.

# 46

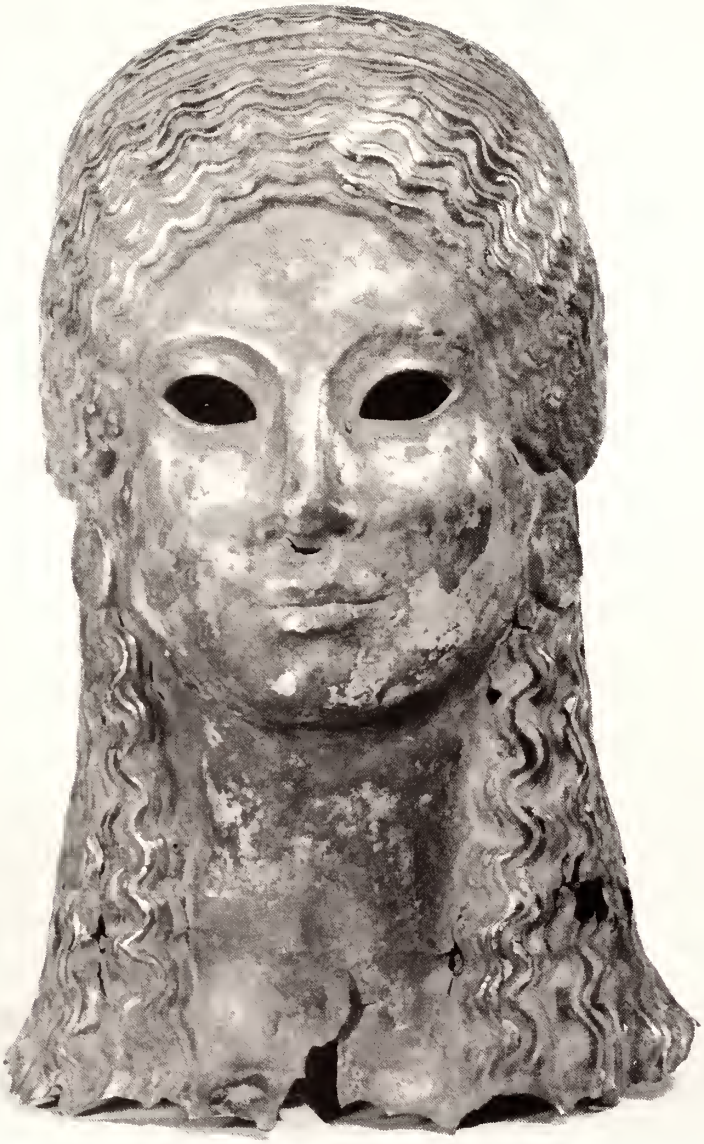
## *Head of a female*

Silver: repoussé and chased
Height 33.7 cm
Max. width 21.3 cm
Length of face 14.6 cm
Weight 1,420 g

Freer Gallery of Art, 66.24
Purchased from Nourollah Cohen, 1966

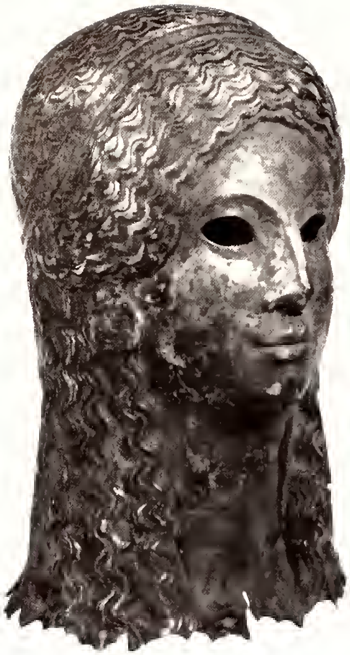
*Exhibited:* Freer Gallery of Art, from 1967.

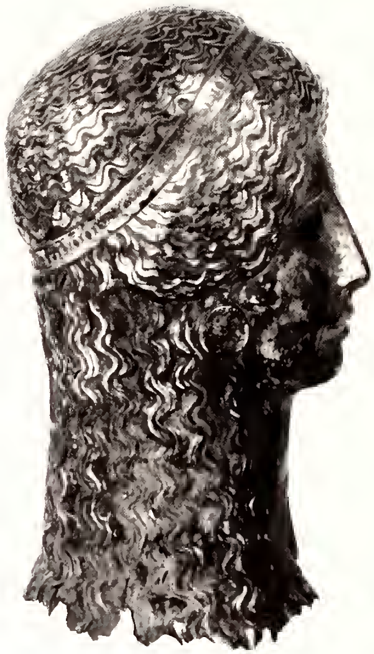
*Published:* Bacon 1967, 54; Atıl 1971, no. 41; Ghirshman 1976, pl. CXXXVI: 6; Colledge 1977, 84.

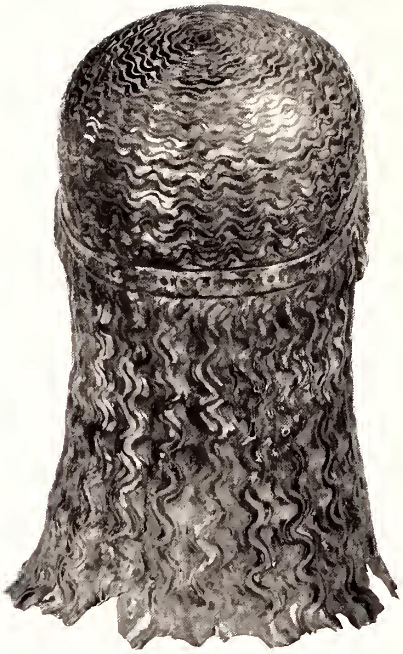


THIS HOLLOW HEAD is broken unevenly around the lower edge of the neck and hair. The hair radiates from the crown in concentric wavy bands, falling to the shoulders in back. Decorated with a pattern of alternating circles and crosses, a fillet is tied around the head; the side locks are pulled up underneath it. The eye sockets are hollow; the face displays an "archaic" smile. Large, circular earrings adorned with dotted lines and small indented circles cover the lobes. The back of the head is finished.

This silver head, allegedly found in Iran, has been published as a work of Parthian art. It illustrates the many difficulties associated not only with the classification and dating of ancient sculptures made of precious metal but also







with the problematic category of Parthian art. Roman Ghirshman cited the head as an example of the representation of females in Parthian art, suggesting that the diadem indicated a royal portrait.[1] In his study of Parthian art, Malcolm Colledge noted the Freer silver head but did not discuss it or attempt to classify it stylistically or chronologically.[2]

Lifesize or colossal sculptures of human figures, made of bronze, have survived from the Parthian era at a small sanctuary located at Shami in southwestern Iran. The two examples whose heads are preserved both represent male figures. One, a fragmentary head modeled in a strongly Hellenistic style, may be a portrait of a Seleucid ruler. The second, an over-lifesize full portrait statue, represents a Parthian ruler.[3] No sculptures made of precious metal have survived from Parthian Iran. Moreover, no sculptures remaining from Parthian Iran in any medium suggest that archaizing Greek styles were favored in Iran during that period.

The absence of parallels for the Freer silver head makes it difficult to discuss as a work of ancient art, and, indeed, there are many reasons to doubt its authenticity on typological as well as stylistic grounds. Technical study of the work, as described below, also casts doubt on its ancient date.

## Technical Discussion

The head was raised from a single sheet of metal. The metal has a generally regular thickness of about one millimeter. No seams or solder lines can be found. Details, such as the waves of the hair and designs on the earrings and hairband, were executed by chasing. The eyes are empty and have a slight lip turned toward the inside of the head. There is no evidence of inlay or any attachment of another element to form the eyes.

The surface condition of the head is atypical but similar to that of the bust of a king [47]. The condition of the metal is the same on the interior surfaces as it is on the exterior. Copper corrosion is not evident. A thick black silver sulfide layer is present in many areas as well as a light, even, overall etching of the metal. While a number of tears are present in the metal and the bottom edge is rough and jagged, the basic form is not distorted and does not appear to have been reshaped. Metallographic examinations of both sculptures yield inconclusive results; while the samples do not exhibit intergranular corrosion, as is often found with ancient silver, neither do they indicate recent manufacture. Given the similarity of the two sculptures in overall condition, surface condition, and elemental composition, and their dissimilarity with typical works of Parthian and Sasanian silver, the indication is that both objects are not authentic and that both come from the same source.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 90.5 |
| Copper | 9.01 |
| Gold | 0.515 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.19 |
| Zinc | 80 |
| Tin | 240 |
| Arsenic | 61 |
| Antimony | 250 |
| Selenium | 5.1 |
| Iron | <20 |
| Cobalt | 0.061 |
| Mercury | 0.88 |
| Chromium | 2.5 |
| Scandium | <0.0026 |

## Notes

1. Ghirshman 1976, 249.

2. Colledge 1977, 84: "a baffling female (divine?) head in silver repoussé, allegedly from Iran, is in an archaizing Greek style."

3. Smith 1988, 101–2, with previous bibliography. For the Parthian figure, see also Kawami 1987, 59–63.

# 47

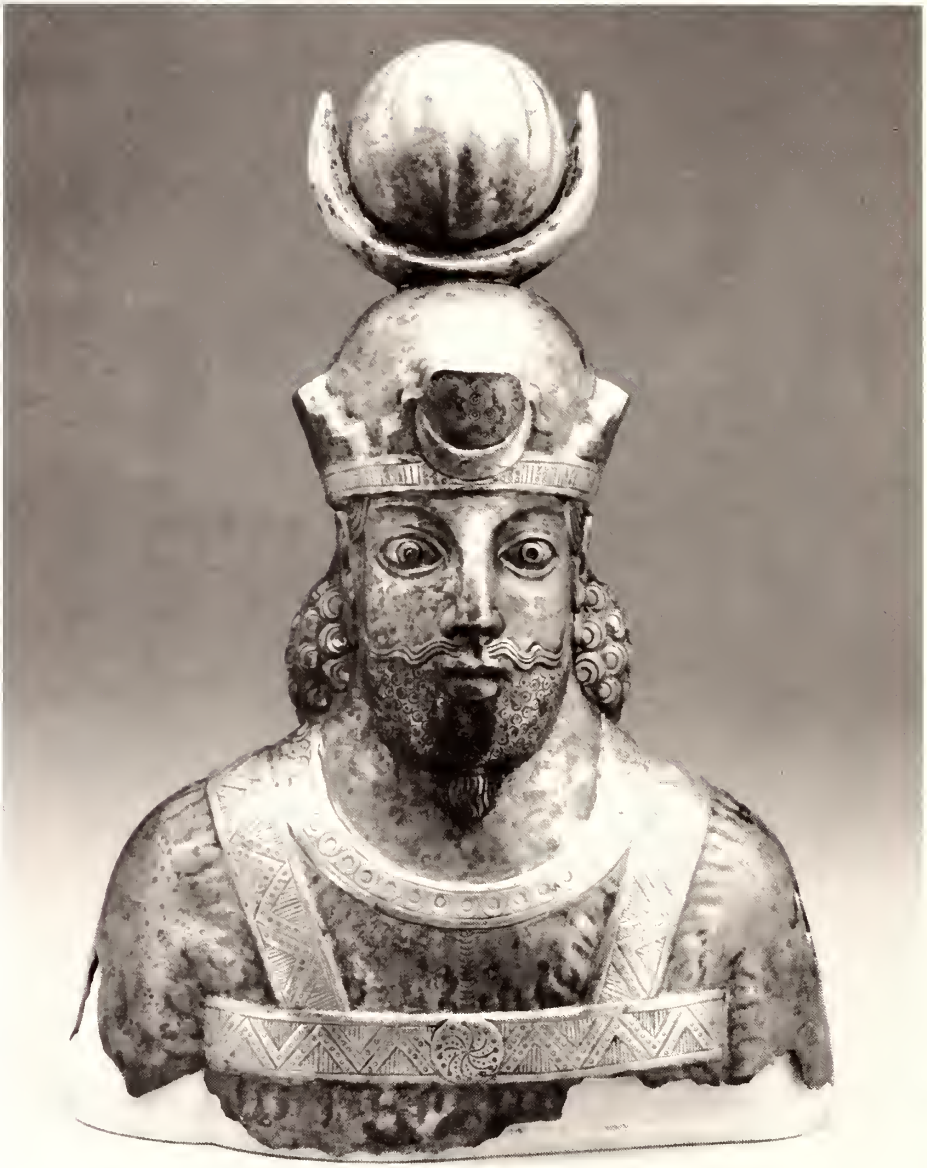
## *Bust*

Silver and gilt: hammered and gilded
Height 32.5 cm
Width at shoulders 23.5 cm
Weight 1,135 g

Freer Gallery of Art, 66.23
Purchased from Nourollah Cohen, 1966

*Exhibited:* Freer Gallery of Art, from 1967.

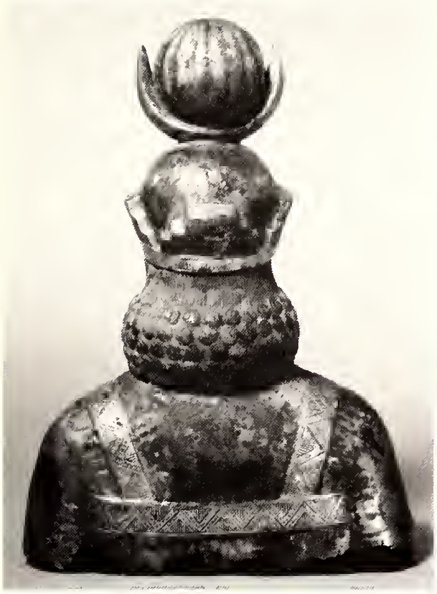
*Published:* Bacon 1967, 54; Atil 1971, no. 44; Shepherd 1983, 1091–92, fig. 98a.

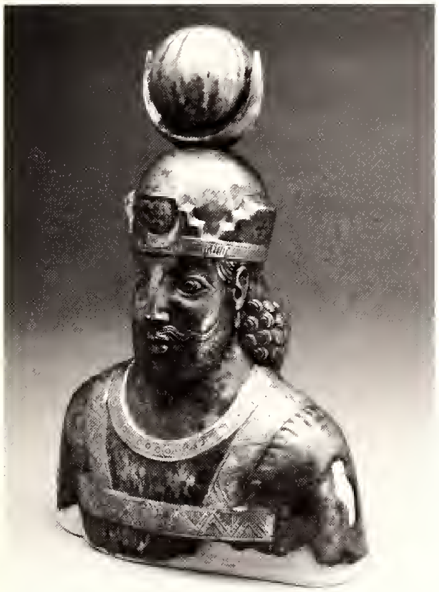


THIS HOLLOW BUST is less than half lifesize. The figure wears a mural crown formed by three-stepped crenellations, a crescent framed by the central crenellation, and a patterned band; the crown is topped by a crescent and a vertically striated globe. The crenellations project forward.

The hair falls in the back in tight curls. The ears lie flat against the head and contain oval pendant earrings. Facial features—including upper and lower lids, pupil, and iris—are fully modeled. Facial hair consists of a carefully waved moustache and a beard, indicated by circles with a central perforation, tied below the chin.

The figure wears a tunic, the neck of which is edged with a band of concentric circles bordered by plain bands. Chest straps are patterned with a double





zigzag; in the center of each strap is a medallion decorated with a whirl pattern. The fabric of the tunic is shown to be gathered and pressed beneath the chest straps, an effect achieved by shallow, wavy grooved lines.

The only other silver sculpture in the round of a Sasanian monarch is the life-size head of a king now in the Metropolitan Museum of Art, New York.[1] Busts of Sasanian royal figures made of copper alloys, similar in form and scale to the Freer silver example, are in the Musée du Louvre, Paris, and in a private collection in Tokyo.[2]

Typological and stylistic considerations, in addition to technical observations presented below, raise serious doubts about the authenticity of the Freer bust. No parallels in silver for this type of object exist in any collection. The only archaeological evidence for the form of the object in Sasanian times are the stone or stucco busts that decorated buildings at several Sasanian sites in Mesopotamia and Iran. Stucco busts of royal figures found in Palace II at Kish in southern Mesopotamia, dating to the fifth century, were probably not portraits of individual kings but representations of the concept of kingship.[3] Four stone busts of the Sasanian king Narseh (r. A.D. 293–302) decorated a square tower with a lengthy inscription, the Paikuli monument, north of Kermanshah in western Iran.[4]

In addition, several stylistic features suggest that the Freer bust was patterned after figures depicted on the royal hunting plates or on the bowls with interior medallions enclosing human busts [see 13–15, 24]. These features seem to be a misunderstanding of stylistic conventions known from two-dimensional plates, which have been awkwardly translated into a three-dimensional sculpture. For example, the paired-line style of drapery has been rendered as the bunching of cloth under the shoulder and cross-straps. In contrast to the flat crenellations of the crown on the silver head in the Metropolitan Museum of Art, the crenellations of the crown on the Freer bust project significantly away from the wall of the crown.

Another problem with the Freer bust is the poor workmanship. The Freer bust shows none of the technical sophistication or artistry of the silver-gilt hunting plates made in royal workshops. While quality of execution alone is not a reliable guide to authenticity, it is one more feature of the bust that is inconsistent with what is known of works of precious metal from royal centers of production.

The troubling typological, stylistic, and technical features of the bust are most plausibly explained as the work of a modern forger, who created the sculpture by using as models stucco busts and royal hunting plates of the Sasanian period. It is noteworthy that the bust appeared on the antiquities market in Iran almost immediately after the silver head of a king—with an alleged Iranian provenance—was acquired by the Metropolitan Museum of Art.

## Technical Discussion

The bust appears to have been formed by hammering. Characteristic variations in the density of the metal, indicating hammering, can be seen in radiographs. Two soldered seam lines are also found: one at the juncture of the globe and the crescent and one between the crescent and rounded top of the crown. The tips of the crescent are solid, while the rest of the bust is hollow, and the metal is of a relatively uniform thickness. A variety of punches was used to chase the details.

The gilding layer appears somewhat thick. The presence of mercury in the gilding is not indicated by X-ray fluorescence nor is there any recessed area that has the granular appearance associated with amalgam gilding. Thus, the absence of amalgam gilding is certain, but the method of gilding that was used is not clear. There are also none of the telltale signs that would suggest leaf gilding.

In the recessed areas of gilding and on a number of high points, the gold appears as if it has been etched. In fact, the overall etched appearance of the metal varies little between the high points and recessed areas. No evidence of copper corrosion can be found on the surface, and this would be unusual for an ancient silver object containing a relatively high percentage of copper. No obvious silver chloride corrosion or intergranular corrosion is apparent. The corrosion consists of thick deposits of black silver sulfide. The silver surface appears virtually the same on the interior of the bust as it does on the exterior.

Although the bottom edge of the bust is jagged and a large hole appears just under the proper left shoulder, the bust is otherwise structurally sound except for a break in the metal that follows the bottom of the hair along the back. No areas appear deformed or reshaped.

The overall condition of the bust, its lack of corrosion, and the details of its manufacture, such as the gilding, suggest that the bust is not an authentic work of Sasanian art.

## Composition

As determined by neutron activation analysis:

| | PERCENT |
|---|---|
| Silver | 88.1 |
| Copper | 11.5 |
| Gold | 0.424 |

| | PARTS PER MILLION |
|---|---|
| Iridium | 0.093 |
| Zinc | 92 |
| Tin | 240 |
| Arsenic | 210 |
| Antimony | 96 |
| Selenium | 4.4 |
| Iron | 140 |
| Cobalt | 0.82 |
| Mercury | 0.68 |
| Chromium | 3.5 |
| Scandium | 0.038 |

## Notes

1. Harper 1966, 137–46; technical notes by Kate Lefferts, 147–51.

2. Parrot 1953; Parrot 1955. For the copper alloy bust formerly in the Elie Borowski collection, see Ghirshman 1962b, 225, fig. 269 (height 36.8 cm). Technical studies of the bronze busts are needed.

Negro Ponzi 1967, 75 n. 96, states that the bronze bust illustrated in Grabar 1967, 137, no. 55, is the Freer object [47]. This is not the case. The catalogue correctly identified the work as a bronze bust in the collection of K. Rabenou.

3. Harper 1978, 108, no. 41; also Harper 1977, 75–79. Massoud Azarnoush has elaborated an identification with Shapur II among stucco busts found in an early Sasanian villa at Hajiabad in southwestern Iran: Azarnoush 1987, 316–23.

4. Harper 1978, 108, with bibliography; Harper 1966, 137–43.

# *Appendix*

## *Analytical Techniques*

TABLES 1–3 GIVE the results of compositional analyses for the objects. Neutron activation analysis or energy-dispersive X-ray fluorescence analysis was employed. Neutron activation analysis was used to determine the compositions of most of the silver objects. The analyses were performed by Pieter Meyers and his colleagues at the Brookhaven National Laboratory as part of his study with Prudence O. Harper of Sasanian silver. Some of the analytical results have been previously published, and more will follow in Harper and Meyers's subsequent publications.[1] Details of the technique employed have been previously published and will only be summarized here.[2]

Prepared silver standards and drilled samples weighing between two hundred and eight hundred micrograms were placed in pure quartz vials and irradiated for thirty minutes in a High Flux Beam reactor at a flux of 1.8 x 1014 neutron/$cm^2$/sec. Gamma-ray spectra were recorded for each sample using a 40-cc Ge (Li-drifted) semiconductor gamma-ray detector coupled with a pulse height analyzer. Determinations were then made for the silver, gold, and copper contents. It was assumed that these three elements totaled 100 percent; because the presence of other elements would rarely be more than 1 to 2 percent of the total, a negligible error is introduced. Chemical separation was then used to remove silver, copper, and gold from the samples and the samples were again irradiated to determine the minor and trace elements. The results quoted for the measurement of silver, copper, and gold have an accuracy of ±5 percent for the values reported. An accuracy of ±10 to ±25 percent was obtained for the measurements of iridium, zinc, tin, arsenic, antimony, and selenium, and the results are given in parts per million. The results for iron, cobalt, and mercury may not accurately represent the amounts of these elements in the objects because of their inhomogeneous presence in the alloy.[3] Lead contents in silver cannot be determined by this technique.

A correlation between the gold, silver, and iridium contents of various objects and their dating and decoration has been posited by Meyers.[4] For comparison, a diagram charting the correlation of gold and iridium, based on Meyers's example, is given here for the Freer and Sackler objects (fig. 1).

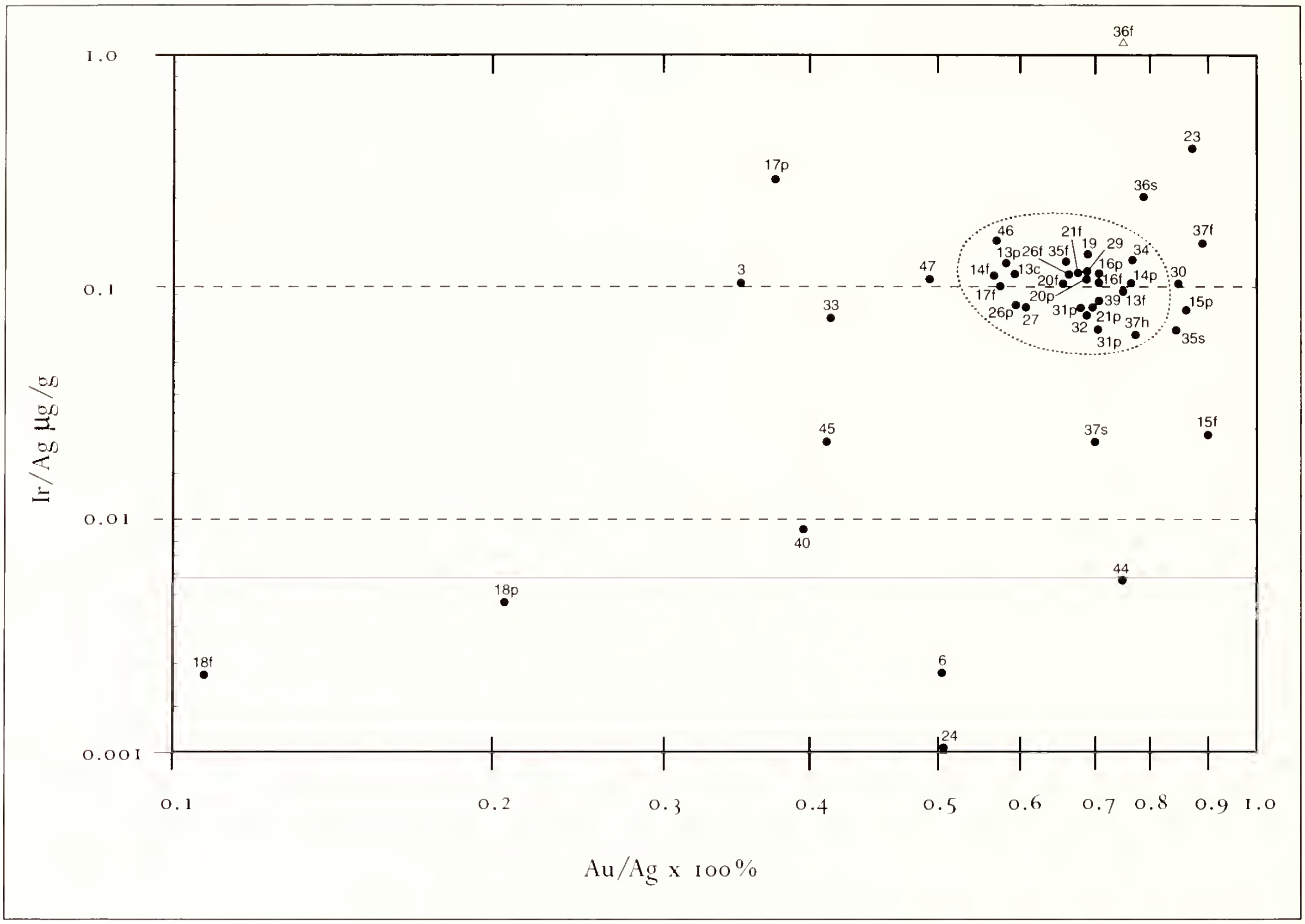


Fig. 1. Diagram charting the correlation of gold and iridium in silver objects (identified by catalogue numbers).

For objects composed of bronze or gold as well as for a few objects composed of silver, the elemental compositions were determined using energy-dispersive X-ray fluorescence surface analysis. Analysis using X-ray fluorescence was chosen because it does not require the removal of samples and generally gives very satisfactory results. Also, no other method was available that would provide results even roughly comparable to those obtained by neutron activation analysis using a similarly minute sample size.

No preparation of the surfaces to be analyzed was employed with the exception of exercising great care in their choice. Clean, relatively flat areas, which provide the best conditions for surface analysis, were present in most cases except for a few silver and bronze objects. Commercial and prepared standards of various gold, silver, and bronze alloys were employed for quantification.

With one exception, the analyses were performed at the Division of Conservation, National Gallery of Art, by conservation scientist Lisha Glinsman, and in the case of [38] by conservation scientist Deborah Rendahl.

A Kevex 0750A Spectrometer was used with a $BaCl_2$ secondary target, a 6-mm collimator, and a count time of two hundred seconds. The gold artifacts were analyzed using 60 KV and 0.6 mA; silver objects were analyzed using 45 KV and 0.5 mA; bronze alloys were analyzed using 60 KV and 0.2 mA. Quantification was performed by the EXACT program, the standard Kevex software that calculates the weight percentages of the elements.

For those elements present in amounts greater than 1 percent, the results quoted have an accuracy of ±5 percent for the values reported. The accuracy of numerical results of X-ray fluorescence analysis for elements present in amounts of less than 1 percent is ±50 percent. In some cases, the presence of elements in trace amounts was determined, but those amounts could not be quantified.[5]

One silver vessel [7] was analyzed by John Winter of the Department of Conservation and Scientific Research, Arthur M. Sackler Gallery and Freer Gallery of Art. An Omega V X-ray fluorescence analyzer constructed by Data Acquisition and Control was used. The Omega V uses primary excitation combined with filters rather than secondary excitation. Analyses were performed using a 2.5-mm collimator, 35 KV and 0.55 mA, and a count time of one hundred seconds. Four spots were analyzed and the results were averaged. Quantification was performed using Spectrace Instruments software and the program called SSXRF in its Fundamental Parameters option. The accuracy of this analysis is comparable to that for the other X-ray fluorescence results.

The figures for the X-ray fluorescence analyses represent the analyses of small surface areas and areas underlying the surface to a depth between ten to twenty microns. The extent to which these areas are representative of the composition of the entire object can vary greatly. Ancient objects composed of gold or silver alloys can become enriched in those elements at the surface due to original surface treatments, corrosion, or subsequent cleaning. The analyses of clean surfaces of silver objects formed by hammering, however, have been found to generally be quite representative of the metal's composition as a whole (see, for example, the analytical results in the catalogue entries for [3, 38], for which repeat analyses using X-ray fluorescence were done to check their comparability with the results from neutron activation analyses for the major components of the alloy). For corroded bronzes, however, and particularly for those that contain lead or are cast, surface analysis is generally inaccurate and can only roughly approximate the object's composition.[6]

X-ray fluorescence surface analyses was also used in the examination of the gilded areas of many vessels. This analysis was performed to determine the presence or absence of mercury and thus help confirm the accuracy of judgments made on the presence of leaf gilding or amalgam gilding by microscopic observation. Also, for two vessels, the accuracy of the surface analysis of gilding layers was checked using electron microprobe analysis of metallographic cross sections taken from the vessels. In one case [35] a sample of amalgam gilding was examined, while in another [11] a sample of leaf gilding was examined. The microprobe results from these samples were compared with results obtained from prepared samples of amalgam gilded and leaf gilded silver. As expected, the amalgam gilded sample from [35] contained relatively large amounts of mercury. The sample of leaf gilding, taken from a Parthian rhyton [11], contained barely measurable amounts of mercury. No mercury was detected by surface analysis using X-ray fluorescence in any of the gilding layers of Parthian works.

X-ray fluorescence surface analysis was used to examine solder joints on the gold objects also. Except for areas of obvious repair, where lead solders were occasionally found, only hard solders were present. Cadmium, a constituent of many modern solders, was not found in any of the hard solders.

## Notes

1. Harper and Meyers 1981.
2. Meyers, Van Zelst, and Sayre 1973; Meyers, Van Zelst, and Sayre 1974.
3. Harper and Meyers 1981, 159.
4. Harper and Meyers 1981, 150–53; Meyers, Van Zelst, and Sayre 1974.
5. Deborah Rendahl, personal communication.
6. Atil, Chase, and Jett 1985, 262–64.

# Table 1

## Analysis of Bronze Objects, by Percent

| Cat. No. | Copper | Tin | Lead | Iron | Silver | Antimony |
|---|---|---|---|---|---|---|
| 1 | 81 | 15 | 4 | 0.3 | 0.07 | 0.05 |
| 2 | 71 | 28 | 0.5 | 0.2 | 0.09 | 0.05 |
| 4 (body) | 91 | 9 | 0.2 | 0.23 | 0.06 | 0.03 |
| 4 (handle) | 70 | 11 | 19 | 0.5 | 0.2 | 0.3 |
| 8 | 72 | 21 | 7 | 0.2 | 0.05 | 0.05 |
| 22 | 79 | 21 | bdl | 0.1 | 0.04 | bdl |

# *Table 2*

## Analysis of Silver Objects, by Percent for Silver, Copper, Gold, and Lead; by Parts per Million for Other Elements

| Cat. No. | Silver | Copper | Gold | Lead* | Iridium | Zinc | Tin | Arsenic |
|---|---|---|---|---|---|---|---|---|
| 3 | 97.3 | 2.41 | 0.337 | | 0.11 | 7.0 | 40 | 0.37 |
| 5 (body) | 97 | 3 | 0.5 | 0.5 | | | | |
| 5 (foot) | 97 | 2 | 0.6 | 0.6 | | | | |
| 6 | 96.1 | 3.37 | 0.487 | | 0.0021 | 13 | 25 | 0.96 |
| 7 | 97 | 1.3 | 1.1 | 0.5 | | | | |
| 9 (horn) | 96 | 2 | 0.7 | 0.7 | | | | |
| 9 (protome) | 92 | 5 | 1 | 1 | | | | |
| 10 (horn) | 99 | 1 | 0.5 | bdl | | | | |
| 10 (protome) | 99 | 0.8 | 0.5 | bdl | | | | |
| 11 (horn) | 99 | 0.4 | 0.7 | bdl | | | | |
| 11 (band) | 97 | 1 | 0.6 | 0.7 | | | | |
| 13 (plate) | 94.3 | 5.10 | 0.550 | | 0.14 | 29 | <32 | 11 |
| 13 (foot) | 94.4 | 4.90 | 0.691 | | 0.082 | 32 | <40 | 13 |
| 13 (crown) | 94.9 | 4.50 | 0.556 | | 0.11 | 11 | <17 | 9.5 |
| 14 (plate) | 92.1 | 7.17 | 0.708 | | 0.10 | 93 | <35 | 19 |
| 14 (foot) | 54.5 | 45.2 | 0.294 | | 0.070 | 14000 | 690 | 2500 |
| 15 (plate) | 91.3 | 7.96 | 0.784 | | 0.060 | 200 | 620 | 59 |
| 15 (foot) | 92.4 | 6.75 | 0.835 | | 0.021 | 75 | 590 | 39 |
| 16 (plate) | 94.2 | 5.16 | 0.668 | | 0.11 | 210 | 330 | 16 |
| 16 (foot) | 94.1 | 5.23 | 0.668 | | 0.10 | 210 | 330 | 16 |
| 17 (plate) | 68.9 | 30.9 | 0.245 | | 0.18 | 61 | <26 | 170 |
| 17 (foot) | 93.8 | 5.66 | 0.538 | | 0.095 | 150 | 8000 | 300 |
| 18 (plate) | 79.1 | 20.8 | 0.169 | | 0.0030 | 65 | <86 | 130 |
| 18 (foot) | 80.5 | 19.4 | 0.0935 | | 0.0016 | 60 | 110 | 120 |
| 19 | 92.1 | 7.28 | 0.632 | | 0.17 | 52 | <14 | 88 |
| 20 (plate) | 85.7 | 13.6 | 0.594 | | 0.099 | 31 | <15 | 11 |
| 20 (foot) | 47.6 | 52.1 | 0.315 | | 0.054 | 62000 | 7900 | 628 |
| 21 (plate) | 95.5 | 3.81 | 0.668 | | 0.067 | 60 | <17 | 1.0 |

* Where lead contents are given, analysis was performed using energy-dispersive X-ray fluorescence; where no lead content is given, analysis was performed using neutron activation and lead was not measured.

| Cat. No. | Antimony | Selenium | Iron | Cobalt | Mercury | Cromium | Scandium |
|---|---|---|---|---|---|---|---|
| 3 | 0.22 | 0.39 | 6.2 | 0.019 | 0.16 | 0.22 | <0.0016 |
| 5 (body) | | | | | | | |
| 5 (foot) | | | | | | | |
| 6 | 0.53 | 1.5 | 42 | 0.046 | 0.073 | 0.29 | 0.0016 |
| 7 | | | | | | | |
| 9 (horn) | | | | | | | |
| 9 (protome) | | | | | | | |
| 10 (horn) | | | | | | | |
| 10 (protome) | | | | | | | |
| 11 (horn) | | | | | | | |
| 11 (band) | | | | | | | |
| 13 (plate) | 3.8 | 1.6 | 58 | 1.2 | 0.082 | 0.67 | <0.0018 |
| 13 (foot) | 3.8 | 7.5 | 28 | 0.89 | 0.52 | 0.21 | <0.0019 |
| 13 (crown) | 1.3 | 4.7 | <2.9 | 0.056 | 4.1 | 0.16 | <0.0019 |
| 14 (plate) | 4.2 | 3.9 | <8.1 | 0.10 | 5.1 | <0.20 | <0.0017 |
| 14 (foot) | 300 | 60 | 430 | 51 | <0.16 | <1.1 | 0.14 |
| 15 (plate) | 7.1 | 3.7 | 160 | 3.2 | 0.14 | 0.79 | 0.082 |
| 15 (foot) | 6.5 | 2.5 | 43 | 0.75 | 0.17 | 0.23 | 0.0034 |
| 16 (plate) | 2.1 | 1.3 | <6.4 | 0.53 | 0.12 | <0.28 | <0.00018 |
| 16 (foot) | 2.3 | 1.5 | <9.7 | 0.15 | 0.22 | <0.38 | <0.0026 |
| 17 (plate) | 39 | 34 | 3.5 | 4.7 | 0.51 | 0.31 | <0.0018 |
| 17 (foot) | 46 | 10 | 100 | 12 | 0.081 | 0.13 | <0.0027 |
| 18 (plate) | 13 | 38 | <16 | 1.6 | 0.62 | <0.52 | <0.0049 |
| 18 (foot) | 15 | 9.8 | <16 | 12 | 0.16 | <0.29 | <0.0073 |
| 19 | 3.4 | 3.7 | <3.0 | 0.94 | 0.084 | 0.52 | 0.0012 |
| 20 (plate) | 3.6 | 1.7 | <4.4 | 0.10 | 0.031 | <0.17 | <0.0010 |
| 20 (foot) | 211 | 17 | 290 | 12 | 0.15 | <1.2 | <0.0074 |
| 21 (plate) | 0.89 | 0.85 | 1.3 | 0.057 | 0.053 | 0.060 | <0.0012 |

*(Continued on following page)*

# Table 2 *(Continued from previous page)*

## Analysis of Silver Objects, by Percent for Silver, Copper, Gold, and Lead; by Parts per Million for Other Elements

| Cat. No. | Silver | Copper | Gold | Lead* | Iridium | Zinc | Tin | Arsenic |
|---|---|---|---|---|---|---|---|---|
| 21 (foot) | 94.4 | 5.01 | 0.640 | | 0.12 | 49 | 40 | 0.41 |
| 23 | 91.7 | 7.48 | 0.806 | | 0.33 | 210 | 650 | 130 |
| 24 | 98.0 | 1.47 | 0.498 | | 0.0013 | 3.8 | <20 | 0.11 |
| 25 | 93.5 | 4.5 | 0.7 | 0.7 | | | | |
| 26 (bowl) | 94.5 | 4.99 | 0.559 | | 0.066 | 99 | 69 | 11 |
| 26 (foot) | 95.4 | 3.92 | 0.642 | | 0.12 | 18 | <20 | 12 |
| 27 | 94.4 | 5.07 | 0.580 | | 0.064 | 17 | <28 | 3.0 |
| 28 | 96 | 3 | 0.7 | 0.3 | | | | |
| 29 | 93.3 | 6.03 | 0.640 | | 0.12 | 21000 | 330 | n.m. |
| 30 | 73.9 | 25.5 | 0.627 | | 0.082 | 2000 | 380 | 110 |
| 31 (bowl) | 93.2 | 6.18 | 0.638 | | 0.066 | 17 | 95 | 1.3 |
| 31 (foot) | 89.9 | 9.47 | 0.639 | | 0.042 | 21 | 290 | 7.8 |
| 32 | 95.6 | 3.78 | 0.663 | | 0.058 | 48 | <36 | 2.0 |
| 33 | 97.1 | 2.46 | 0.421 | | 0.071 | 17 | <30 | 0.46 |
| 34 | 94.7 | 4.56 | 0.701 | | 0.15 | 26 | <25 | 3.0 |
| 35 (spout) | 95.4 | 3.81 | 0.815 | | 0.048 | 33 | 11 | 0.43 |
| 35 (foot) | 70.4 | 29.1 | 0.464 | | 0.12 | 17000 | 610 | 130 |
| 36 (spout) | 96.6 | 2.61 | 0.751 | | 0.25 | 13 | <16 | 0.28 |
| 36 (foot) | 62.1 | 37.4 | 0.446 | | 7.3 | 360 | 340 | 130 |
| 37 (spout) | 96.6 | 2.77 | 0.675 | | 0.016 | 26 | 17 | 0.39 |
| 37 (foot) | 94.7 | 4.47 | 0.839 | | 0.15 | 12 | <42 | 0.75 |
| 37 (handle) | 93.1 | 6.22 | 0.718 | | 0.049 | 1100 | 690 | 21 |
| 38 | 96.3 | 3.03 | 0.716 | | 0.0052 | 46 | 63 | 2.2 |
| 39 | 92.6 | 6.73 | 0.653 | | 0.071 | 320 | 670 | 19 |
| 40 | 92.4 | 7.28 | 0.349 | | 0.0074 | 16 | <39 | 52 |
| 45 | 95.9 | 3.66 | 0.425 | | 0.019 | 20 | <37 | 97 |
| 46 | 90.5 | 9.01 | 0.515 | | 0.19 | 80 | 240 | 61 |
| 47 | 88.1 | 11.5 | 0.424 | | 0.093 | 92 | 240 | 210 |

* Where lead contents are given, analysis was performed using energy-dispersive X-ray fluorescence; where no lead content is given, analysis was performed using neutron activation and lead was not measured.

| Cat. No. | Antimony | Selenium | Iron | Cobalt | Mercury | Cromium | Scandium |
|---|---|---|---|---|---|---|---|
| 21 (foot) | 1.5 | 1.0 | 16 | 1.4 | 0.058 | 0.076 | 0.013 |
| 23 | 5.5 | 1.2 | 25 | 0.53 | 0.40 | 1.7 | 0.0037 |
| 24 | 0.14 | 0.73 | <5.4 | <0.019 | 0.55 | <0.14 | <0.0016 |
| 25 | | | | | | | |
| 26 (bowl) | 3.8 | 1.5 | <3.0 | 0.11 | 0.18 | 0.13 | <0.0012 |
| 26 (foot) | 0.91 | 1.6 | 3.6 | 0.079 | 0.093 | 0.98 | 0.00071 |
| 27 | 2.7 | 1.7 | <4.4 | 0.050 | 0.32 | <0.16 | <0.00090 |
| 28 | | | | | | | |
| 29 | 3.14 | 3.1 | 8.3 | 0.56 | 0.064 | 0.49 | <0.0008 |
| 30 | 19 | 9.0 | 130 | 30 | 0.69 | <0.37 | <0.014 |
| 31 (bowl) | 0.84 | 0.60 | 9.8 | 0.064 | 0.14 | 0.61 | <0.0011 |
| 31 (foot) | 21 | 2.8 | 89 | 0.46 | 0.14 | 4.8 | <0.0011 |
| 32 | 0.62 | 1.1 | 72 | 1.1 | 3.3 | 0.24 | <0.0020 |
| 33 | 0.51 | 1.3 | 7 | 0.047 | 2.9 | 0.35 | 0.0027 |
| 34 | 0.97 | 2.7 | 18 | 0.73 | 0.76 | 1.1 | 0.0035 |
| 35 (spout) | 0.49 | 1.4 | 4.3 | 0.28 | 0.060 | 0.20 | 0.0027 |
| 35 (foot) | 36 | 79 | 63 | 0.79 | 1.7 | <0.074 | <0.026 |
| 36 (spout) | 0.15 | 1.7 | <3.8 | 0.039 | 1.0 | 0.54 | 0.0012 |
| 36 (foot) | 14 | 28 | <24 | 0.88 | <0.038 | 17 | 0.0064 |
| 37 (spout) | 0.18 | 0.46 | <6.4 | 0.026 | 0.040 | 0.19 | <0.0012 |
| 37 (foot) | 0.32 | 1.9 | 29 | 0.18 | 0.096 | 2.8 | <0.0014 |
| 37 (handle) | 15 | 2.1 | 36 | 0.60 | 0.22 | 2.4 | <0.0017 |
| 38 | 3.4 | 0.51 | 39 | 0.26 | 0.67 | 0.66 | 0.0031 |
| 39 | 25 | 7.7 | <9.8 | 0.13 | 2.3 | 0.28 | 0.0068 |
| 40 | 37 | 3.5 | 5.0 | 0.19 | 0.14 | 0.42 | <0.0022 |
| 45 | 32 | 3.8 | 18 | 0.060 | 17 | 0.29 | 0.0055 |
| 46 | 250 | 5.1 | <20 | 0.061 | 0.88 | 2.5 | <0.0026 |
| 47 | 96 | 4.4 | 140 | 0.82 | 0.68 | 3.5 | 0.038 |

# *Table 3*

## Analysis of Gold Objects, by Percent

| Cat. No. | Gold | Silver | Copper |
|---|---|---|---|
| 12 | 99 | 0.5 | 0.8 |
| 41 (sheath) | 98 | 1 | 0.7 |
| 41 (handle) | 98 | 1 | 0.8 |
| 42 (obverse) | 97 | 3 | 1 |
| 42 (reverse) | 90 | 8 | 3 |
| 43 (63.15) | 95 | 2 | 3 |
| 43 (64.6) | 95 | 2 | 3 |
| 44 | 98 | 0.9 | 0.8 |

# Concordance

## Arthur M. Sackler Gallery

| Accession No. | Object | Cat. No. |
|---|---|---|
| s1987.32 | Drinking vessel | 44 |
| s1987.33 | Horn rhyton | 38 |
| s1987.73 | Phiale | 1 |
| s1987.74 | Phiale | 2 |
| s1987.105 | Bowl | 25 |
| s1987.106 | Bowl | 26 |
| s1987.107 | Roundel | 39 |
| s1987.108 | Plate | 22 |
| s1987.109 | Plate | 15 |
| s1987.111 | Elliptical bowl | 27 |
| s1987.113 | Plate | 18 |
| s1987.114 | Bowl | 6 |
| s1987.115 | Plate | 19 |
| s1987.116 | Lobed elliptical bowl | 30 |
| s1987.117 | Ewer | 35 |
| s1987.118 | Ewer | 36 |
| s1987.123 | Plate | 20 |
| s1987.124 | Plate | 17 |
| s1987.125 | Plate | 21 |
| s1987.128 | Horn rhyton | 9 |
| s1987.130 | Horn rhyton | 10 |
| s1987.131 | Horn rhyton | 11 |
| s1987.133 | Bowl | 7 |
| s1987.134 | Jug | 4 |
| s1987.137 | Lobed elliptical bowl | 31 |
| s1987.139 | Disk | 40 |
| s1987.140 | Ewer | 37 |
| s1987.143 | Elliptical bowl | 29 |
| s1987.144 | Bowl | 5 |
| s1987.200a–i | Handle and chapes | 41 |
| s1987.201a–ii | Belt buckle and lappet fittings | 42 |

## Freer Gallery of Art

| Accession No. | Object | Cat. No. |
|---|---|---|
| 09.139 | Vessel handle | 8 |
| 34.23 | Plate | 13 |
| 45.33 | Shallow bowl or boss | 23 |
| 57.20 | Bowl | 24 |
| 58.7 | Plate | 45 |
| 61.22 | Heart-shaped ornament | 12 |
| 62.1 | Plate | 14 |
| 63.15 and 64.6 | Two vessel handles | 43 |
| 64.3 | Vase | 32 |
| 64.10 | Plate | 16 |
| 65.20 | Vase | 33 |
| 66.1 | Vase | 34 |
| 66.23 | Bust | 47 |
| 66.24 | Head of a female | 46 |
| 74.30 | Phiale | 3 |
| 1985.28 | Elliptical bowl | 28 |

# Glossary

Words set in SMALL CAPS are defined elsewhere in the Glossary.

*Alloy*
A mixture of two or more metals, usually fused together by being dissolved in each other while molten. Silver, for example, is frequently alloyed with a small percentage of copper to obtain more desirable physical properties and for economic advantage.

*Annealing*
The heating of metals to cause recrystallization of the metallic structure. Used frequently in metalworking when an object is formed by hammering to remove strain in the metal and make it more ductile (malleable).

*Bronze*
When used to describe ancient metalwork, an ALLOY of copper and tin. Often other metals, particularly lead, are added as well. The term is now generally used with a modifier that defines the principal metal alloyed with copper, such as "tin bronze" or "arsenical bronze." High-tin bronze, also known as "white" bronze or speculum metal, is a brittle, silver-colored alloy containing approximately 20 percent tin.

*Casting*
The process of making a metal object by pouring molten metal into a refractory void, or hole, and allowing it to solidify. The refractory void is usually contained in a mold. A core is necessary if the cast metal object is to contain a hollow space. Methods of casting include the use of open-face molds, sand molds, ciré-perdue (or "lost-wax" investment molds), and piece molds made of refractory material (such as ceramic or stone) fitted together.

*Chasing*
Decorating the metal by hammering from the front or exterior surface of the object; employing PUNCHES with ends of various shapes. The metal vessel or sheet is often backed with pitch or tar to support it during the chasing operation.

*Chatter Marks*
Short, parallel lines made when a tool, such as a graver or a chisel, skips across a surface; chatter marks lie perpendicular to the course that the tool has traveled.

*Corrosion*
Gradual wearing away, decomposition, or disintegration by chemical processes; in metals, the tarnishing of silver is an example of corrosion.

*Crimping*
A term used in discussing Sasanian silverwork, referring to the technique where CAST or REPOUSSÉ-formed pieces of a decorative scene are attached to the body of a plate.

An outline of the part to be attached is made, the surface metal within the outline is carved away, and a lip is raised. The edge of the added piece is then set underneath the lip, which is set down using pressure. After burnishing, CHASING, and GILDING, the join can be virtually invisible. Crimping is different from inlay in that the added elements generally stand well above the surrounding surface.

*Double Shell*
The use of two separate sheets of metal that are decorated, usually by REPOUSSÉ, and then joined together. Double shell construction is frequently found among imitations of Sasanian silver plates and bowls.

*Engraving*
A decorative technique in which metal is removed by cutting into the surface with such tools as gravers, burins, or scrapers. The typical engraved line has a tapered lead-in (where the graver digs gradually into the metal) and an exit (where the graver leaves the metal) or an abrupt end (where the chip raised by the graver is broken off).

*Gilding*
The application of a thin layer of gold to a surface. This may entail the use of gold sheet (sheet gilding), gold leaf (leaf gilding), or amalgam gilding (also called fire gilding). In amalgam gilding, a pasty mixture of mercury and gold is applied to the metal surface. The object is then heated to evaporate the mercury and leave a gold layer that is burnished to make it bright and smooth. Spot gilding is gilding applied to isolated areas of a surface.

*Granulation*
Decoration by means of small spheres (or granules), usually of gold, attached to a gold sheet.

*Hammering*
Shaping sheet metal by repeated blows of a hammer; RAISING, REPOUSSÉ, and SINKING are examples of the basic techniques of forming by hammering.

*Niello*
A black inlay material made of silver, copper, gold, or lead sulfides. Niello is usually fused with heat into recesses made in the metal surface by CHASING or ENGRAVING; the surface of the niello is then finished.

*Punch*
A tool for surface decoration of metal (or other materials such as leather or wood). Punches, with ends in various shapes—round, square, oval, and ring-shaped—are placed against the surface of the metal to be decorated and struck with a hammer. The technique is called punching or more commonly CHASING.

*Raising*
Hammering a flat sheet of metal into the shape desired by placing the sheet against an anvil and striking it with a hammer on the side of the sheet to form the exterior, or outside, surface. In forming a bowl, ewer, or other vessel shape, the sheet is usually rotated around its major axis as the hammering proceeds.

*Repoussé*
Hammering from the inside of a vessel or back of a sheet to produce raised design areas on the outside or front; also used less commonly to describe the sinking of background areas to create a raised design by working on the outside or front surface. Repoussé, often combined with CHASING, helps define the larger masses of the design

while CHASING refines the relief and sharpens the contours.

*Ring Matting*
An overall surface decoration or texture made by CHASING, using a punch with a ring-shaped, or annular, end.

*Sinking*
Shaping metal sheet by hammering it into a depression. In sinking, the hammering is done from the inside of the piece, whereas in RAISING it is done from the outside.

*Soldering*
The joining of metals by the use of solders, ALLOYS that flow at temperatures lower than the metals being joined to achieve a joint by wetting and adhering to the metals. Solders can be divided into two distinct classes: soft solders and hard solders. Soft solders are basically lead-tin alloys that melt at relatively low temperature (below 300 degrees Centigrade). Hard solders for gold and silver alloys usually contain mixtures of those alloys altered to give a slightly lower melting point and sometimes include the addition of copper.

*Spinning*
Shaping metal sheet into vessels or other round shapes by forcing the sheet while it rotates on a spinning lathe against a metal or wood form called a chuck. The chuck can be made in a number of pieces for removal from the finished shape. Spinning requires a great deal of force, especially for objects of appreciable thickness.

*Tracing*
Where recessed lines are made using a blunt-edged tool that is pulled across a metal surface. The technique appears most frequently on gold, whose soft surface makes it most applicable.

*Turning*
Shaping or finishing metal by cutting it away while the metal object is rotating. Horizontal lathes (like the modern lathe) or vertical rotation (like a potter's wheel) can be used, together with various types of tools (such as chisels, scrapers, or knives).

*Wire*
A piece of metal of great length relative to its thickness, often round in cross section. Wire may be made by many different techniques, such as cutting thin strips from a sheet and twisting them, swaging (repeated hammering of strips into a block with a groove cut in it), or drawing (pulling the wire through a drawplate with a graduated series of holes down to the desired size).

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# Index

Achaemenid metalwork, 17–18, 23–24, 50–52, 224–25; gold and silver, 17–18, 59, 227–28; phiale, 23, 24, 64–73; rhyton, 23, 24, 50, 96, 227
Achalgori treasure, 66
Acid-etching: of gold objects, 58–59, 226, 228; of silver, 235, 238
Aging of metal objects, intentional, 58–59, 226. *See also* Acid-etching
Amalgam gilding, 56, 57, 59–60
Anahita, 29, 150, 200
Annealing of silver vases and ewers, 56
Ariadne: depicted in Sasanian art, 121–25
Artaxerxes, phiale inscribed for, 23, 69–71
Authenticity, methods of determining, 20, 58–59. *See also* Forgeries

Backgammon: depicted in Sasanian art, 163
Bactria: metalwork of the Parthian period, 102; silver of the Sasanian period, 27, 154; as source of influence in Sasanian silver, 163, 206
Banquet: as theme in Sasanian art, 132–33, 162–63
Bear: depicted in Sasanian art, 152
Begram ivories, 124
Belts, Sasanian, 220–21
Berthouville treasure, 95
Bishapur: mosaics from palace of Shapur I, 200
Boar: depicted in Sasanian art, 87–88, 101, 109–10, 133
Bowls: methods of forming and decorating, 53–56; Parthian, 24, 80–86; Sasanian, 27–28, 148–84; Seleucid, 87–89. *See also* Elliptical bowls; High-footed bowls; Medallion bowls
Bronze, 64–68, 74–77, 90–91, 145–47; composition and methods of working, 50–52. *See also* High-tin bronze
Bulgaria, silver vessels found in, 24, 74, 209 n. 6, 226 n. 3
Byzantine silver: influence on Sasanian silver, 19, 167; methods of gilding, 60

Cadmium in modern solders, 103, 226
Caprids: depicted in Sasanian art, 208
Carthage treasure, 170 n. 4
Carving of silver, 54; 54, fig. 1
Central Asian metalwork, classification of, 19. *See also* Bactria; Sogdian silver
Central Sasanian: definition of, 19; royal hunting plates, 27, 109, 115, 119, 124
Chasing, 55, 57, 81–82; 82, fig. 1
China, finds of silver-gilt vessels in, 19, 113 n. 14, 154, 167, 172, 182–83, 212, 213 n. 5
Cinnabar, 100
Coins: Kushano-Sasanian, 108; Sasanian, compared to royal images on silver vessels, 26, 107, 108, 109, 115, 119, 159
Crimping, 54; 54, fig. 2; 55; 55, fig. 3; 137, 159
Crowns, Sasanian: depicted in silver sculpture, 108, 237; depicted on silver vessels, 107–10, 115, 118–19, 132, 133

Decorative techniques. *See* Carving; Chasing; Crimping; Engraving; Gilding; Granulation; Niello; Punch; Tracing
Dionysiac imagery: in Parthian metalwork, 90, 98; on Sasanian silver, 26, 28, 200. *See* also Dionysus
Dionysus: depicted in Sasanian art, 26, 29, 121–24, 188. *See also* Rhyta
Dome punch, 57
Double shell construction, 231

Eagle: depicted in Sasanian art, 231
Egyptian metalwork, 13, 90

Egyptian royal inscribed vessels, 71
Elliptical bowls, Sasanian, 28, 171–84
Engraving, 55
Esquiline treasure, 170 n. 4
Ettinghausen, Richard, 14–15, 158, 186, 196
Euripides, 151
Ewers, Sasanian silver-gilt, 29, 194–204; methods of forming and decorating, 56–57
Exhibitions: of Iranian art, 14, 15, 149; of Sasanian silver, 15, 17

Fakes. *See* Forgeries
Fire gilding. *See* Amalgam gilding
Forgeries, general problem of, 20. *See also* Authenticity
Freer, Charles Lang, as collector of Egyptian antiquities, 13
Freer Shapur plate, 27, 52, 106–13, 115–16; acquisition by Freer Gallery, 14; technique of manufacture, 54, fig. 2; 54–55, 110–12; 111, fig. 1

Genre scenes in Sasanian art, 26, 162–63
Gilding, 59–60; amalgam, 56, 59–60; evolution of methods, 60; in Byzantine silver, 60; leaf, 53, 56, 59–60; spot, 27, 119, 133, 206
Gold, 101–3, 224–29; methods of working and decorating, 57–58; problems of determining authenticity, 58–59; technical examination of, 58–59. *See also* Acid-etching
Gold foil, 59, 60
Gold leaf, 53, 56, 59, 60
Gold sheet, 218, 221
Granulation, 58, 218
Gravure, 55
Gupta art, 154; decorative motifs in, 182–83

Hallmark, 69, 72, 112
Hamadan, 72 n. 2, 227
Hammering techniques: bowls and plates, 53–54; rhyta, 53; vases and ewers, 56–57
Hellenistic ceramic relief bowls, 84, 150–51
Hellenistic metalwork, 87
Hephthalite: origin of sword suspension type borrowed by Sasanians, 218
Heracles: depicted in Sasanian art, 121–22
Hero stabbing lion: depicted in Sasanian art, 178
Herzfeld, Ernst E., 69, 70, 101, 108
High-footed bowls, 27, 166–70
High-tin bronze, 28, 51–52, 64, 66, 91, 145, 166. *See also* Speculum metal
Horae, 193 n. 5, 201 n. 9
Horse: depicted in Sasanian art, 139
Hot-forging, 51, 64, 66

Inscriptions on vessels: Achaemenid, 69–71; Middle Persian, 26, 121, 142–43, 177–78, 192, 195; Parthian, 98
Islamic metalwork, relationship to Sasanian metalwork, 28, 29, 30, 186, 202

Joining, methods of: 53, 56, 57. *See also* Scarf joint; Soldering

Kaiseraugst treasure, 167
Kish, ceramic vase from, 31 n. 22; stucco busts from, 237
Kushan art, 110, 127 n. 2, 154

Lathe: used in forming silver plates, 54–55, 120
Lead in bronzes, 52
Leaf gilding, 53, 56, 59–60

Maenads: depicted in Sasanian art, 29, 122, 124, 188
Medallion bowls, Sasanian silver-gilt, 24, 27, 110, 157–60
"Megarian bowls," 150–51
Mercury: to affix gold leaf, 60, 99–100; in amalgam gilding, 59–60
Merv, ceramic amphora from, 132, 156 n. 6
Metal. *See* Bronze; Gold; High-tin bronze; Pewter; Silver; Speculum metal
Middle Persian inscriptions on silver vessels, 26, 121, 142–43, 192, 195
Mithra, 150

Niello, 153, 155, 167, 169, 182
Nineveh, Parthian metalwork from, 21 n. 21
Nisa, Parthian ivory rhyta from, 24, 96
Northern Qi stone relief depicting horn rhyton, 207
Northern Wei finds of silver-gilt vessels in tombs and hoards, 172, 182
Northern Zhou tomb containing silver-gilt ewer, 29, 154
Ohrmazd, 167
Orsk, Artaxerxes inscription found at, 73 n. 11
Oxus temple, Takht-i Sangin, 96
Oxus treasure, 101, 225, 228

Paikuli monument, 237
Paired-line drapery style, 110, 115, 124, 237
Palmyra, funerary sculptures from, 80, 84–85
Panjikent, wall paintings from: depicting backgammon, 163; depicting metal vessels, 28
Parthian art, 18, 233–34
Parthian ivory rhyta from Nisa, 24, 95–96
Parthian metalwork: general, 18, 24–25; gold objects, 57–58, 101–3; silver bowls, 24, 53–56, 80–86; silver-gilt rhyta, 24, 53, 92–100; silver sculpture, 233–35
Patina, intentional, 51, 100
Peahen: depicted in Sasanian art, 128–29, 167–68
Pereshchepina hoard: gold ewer, 29; gold P-shaped mount, 218; royal hunting plate, 109
Perm: as source of "Sasanian" silver, 14, 29
Persepolis: carved tribute-bearers carrying metal vessels, 23, 224–25
Persepolis Treasury, royal inscribed vessels found in, 70–71
Petosiris, tomb of: reliefs depicting artisans, 18, 49–50
Pewter, 166
Phiale, Achaemenid, 23, 24; bronze, 64–68; silver, 69–73
Plates: methods of forming and decorating, 53–56; Sasanian silver-gilt, 106–44; shapes and chronology, 26–27. *See also* Royal hunting plates
Post-Sasanian, definition of, 19
Punch, 57

Qasr-i Abu Nasr, bronze bowl excavated at, 177
Quenching, 51

Ram with fillet: depicted in Sasanian art, 136, 137, 143
Repoussé. *See* Hammering techniques
Rhyta: Achaemenid, 23, 24, 50, 96, 227; depicted in Hellenistic and Roman art, 98; Parthian ceramic, 206; Parthian

ivory, 24, 95–96; Parthian silver-gilt, 24, 53, 92–100; in Persian literary sources, 30; Sasanian, 29–30, 56, 60, 139, 205–10; Tang dynasty, 208
Ring punch, 57
Roman iconography, influence on Sasanian silver: Seasons and Months, 192, 200; triumph of Dionysus, 122–25. *See also* Dionysiac imagery; Dionysus; Horae; Maenads
Roman silver, 100; influence on Parthian silver, 83–84; influence on Sasanian silver, 19, 28, 29, 166–67. *See also* Berthouville treasure; Carthage treasure; Esquiline treasure; Kaiseraugst treasure
Royal hunting plates, Sasanian, 26–27, 106–20; forming and decorating of, 110–12, 116

Sackler, Arthur M., gift of ancient Iranian metalwork, 15–16
Sasanian silver in North American collections, 14
Scarf joint, 56, 120, 140
Seal devices, Sasanian, and decoration on silver vessels, 129, 137, 139, 146, 170 n. 12, 178, 186, 208, 231
Seleucid metalwork, 24, 234
*Senmurw,* 145
Shading, attempt to indicate in metalwork, 146; 146, fig. 1
*Shahnama,* 132, 139
Shapur II, depicted on royal hunting plates, 107–9; Metropolitan silver head identified as, 108
Silver, composition of, in ancient Iranian metalwork, 52. *See also* Byzantine silver; Hammering techniques; Roman silver; Sogdian silver
Snarling iron, 57
Sogdian silver, 80, 133, 145
Soldering, used to attach vessel feet and handles, 56, 57, 85
Speculum metal, 28, 170 n. 1. *See also* High-tin bronze
Spot gilding, 27, 119, 129, 133, 206
Stroganov collection, 14, 106
"Stroganov plate," 14. *See also* Freer Shapur plate
Stucco, Sasanian: busts, 237; decorative patterns also seen on silver vessels, 87, 113 n. 12, 128, 129, 137, 143, 170 n. 12, 215
Susa, Achaemenid royal vessels found at, 70; Sasanian metalwork excavated at, 166, 174, 220
Swords, Sasanian, 217–18

Tang dynasty silver, 28
Taq-i Bustan, Sasanian grotto at, 29, 108, 163, 202, 218, 220
Technical studies of Sasanian silver, 15, 17, 52–57
Textile patterns, Sasanian, and decoration on silver vessels, 87, 137, 146, 176 n. 5
Textile remains preserved on silver plates, 116, 126, 129, 135, 137–38, 143
Thrace. *See* Bulgaria
Tillya-Tepe, metalwork from, 101–2
Tools, metalworking. *See* Gravure; Hammering techniques; Joining; Punch; Snarling iron
Tracing in gold, 57

Vases, Sasanian silver-gilt, 28–29, 185–93; methods of forming and decorating, 56–57
Verethragna, 137, 150

Wire, gold, 57–58, 102–3, 218, 226

*Xvarnah,* 137

Zoroastrian tradition, images in Sasanian art, 137, 145, 156 n. 4, 167

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